

RENEWING THE NEW ENVIRONMENTAL PARADIGM SCALE:
THE UNDERLYING DIVERSITY OF CONTEMPORARY ENVIRONMENTAL WORLDVIEWS

by

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ABSTRACT

This dissertation explored the attitudes, values, and beliefs underlying the contemporary environmental movement. At present, the most widely used means of measuring environmental attitudes is the New Environmental Paradigm (NEP) Scale. This dissertation chronicles the development and establishment of the NEP and the important role it has played in social science research. It also reviews key empirical and theoretical critiques of the scale, arguing that the worldview embodied by the NEP is representative of a narrow understanding of pro-environmental thought and that there remains the need for a new scale built using the core dimensions underlying contemporary environmentalism's diversity. Based on an assessment of contemporary environmental discourse, it was theorized that the key areas in which environmentalists diverge are with respect to nature, technology, and scale of societal response. To test this assertion, this project deeply explored a small sample of carefully selected participants with strong environmental identities and diverse attitudes and values. Quantitative and qualitative data was collected using survey question items and in-depth Repertory Grid interviews. Foremost, analysis showed that the sample of environmentalists studied were far from ideologically homogenous. While they agreed with respect to certain issues, such as the seriousness of environmental problems and the inability of the earth to accommodate unlimited resource demands, they also disagreed in key areas, such as the ability of technology to solve environmental problems and the scale at which effective change occurs. With respect to effective environmental problem solving, respondents mentioned green technologies, reducing resource consumption, and policy changes, and they differentiated between these solutions based on cost, the type of social change needed to bring these solutions to fruition, and how difficult they would be to enact. Demographic differences were also assessed: younger respondents were more likely to mention green technology and alternative transportation while older respondents discussed individual political engagement and education and awareness. Respondents were also clustered on the basis of their shared worldviews, which suggested that participants formed four key ideologically coherent groups. Analysis of the attitudes, values, and worldviews of each group and its members showed both internal cohesiveness as well as heterogeneity. The conclusion

suggests the components of the NEP that should be retained, points to topical and theoretical additions, and establishes a framework for future research at the population level.

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CHAPTER 1

INTRODUCTION

This dissertation looked at the diversity of attitudes, values, and beliefs underlying the contemporary environmental movement. At present, the most widely used means of measuring environmental attitudes is the New Environmental Paradigm (NEP) Scale. While the NEP has increased our understanding of environmental worldviews since its introduction in 1978, it makes assumptions about what environmentalism is and is not. Alternative attempts to quantify contemporary environmentalism have rectified some of the NEP's analytical and theoretical issues, but remain problematic due to their unidimensionality and pre-suppositions on the part of the researchers. There remains the need for a new scale based on the core dimensions underlying contemporary environmentalism's diversity, but those core dimensions have not yet been clearly articulated. This research project deeply explored a small sample of environmentalists to illustrate the underpinnings of contemporary environmental thought. After carefully selecting participants with strong environmental identities and diverse attitudes and values, quantitative and qualitative data was collected using survey questions and in-depth Repertory Grid interviews. This elucidated environmentalists' approaches to environmental problem solving, the underlying frameworks they used to categorize environmental issues, and the core areas in which they differed from one another. The conclusions suggest the components of the NEP that should be retained, point to topical and theoretical additions, and establish a framework for future research at the population level.

To understand contemporary environmental thought, it is imperative to understand its history. This includes the core values and worldviews that the movement draws upon, the environmental problems that constitute its focus, and its preferred strategies for enacting change, as well as how and why these have changed over time. It is also crucial to understand the development of the New Environmental Paradigm scale, its rise to academic dominance, and what worldviews it characterizes as constituting pro-environmental thought. Out of this understanding, key areas of further research can be identified.

Background

The Evolution of Contemporary Environmentalism

Environmentalism in the United States has its roots in the transcendentalists—Emerson, Thoreau, Muir—who found spiritual renewal in America’s grand landscapes and feared the effects of human interference in the name of economic progress (Nash, 1982). The established conservation movement, which was primarily concerned with non-human issues like wilderness preservation and threatened species, was transformed after World War 2 as American’s “basic needs” were increasingly met. The mainstream environmental movement has multiple alleged birthdays (the 1969 Santa Barbara Oil Spill, the 1969 Cuyahoga River Fire, Lynn White’s 1967 indictment of the “anthropocentric” Judeo-Christian worldview), and became personified by figureheads like Rachel Carson and David Brower. The movement emerged in full force, so the story goes, on Earth Day in 1970, initiating the groundswell of grassroots support that ultimately brought about legislation like the Clean Air Act (1970), the Clean Water Act (1972) and the Endangered Species Act (1972) (Gottlieb, 1993; Nash, 1982).

But this well-worn narrative neglects to recognize the environmental movement *already* well-established by the late 1960’s. Originally, the environment was included with other disenfranchised groups defended by the “New Left”, along with ethnic minorities, women, and the poor. These early 1960’s environmentalists found pollution problematic because of its adverse effects on urban residents, rather than its effect on the biophysical environment. Even the great tome of environmentalism, Carson’s *Silent Spring*, reflects this less-remembered narrative as it critiques science for being a tool of industry lacking public oversight and input (Gottlieb, 1993). The first Earth Day, held in 1970, received copious media attention, making it seem as though environmentalism was a set of values born out of nowhere- in essence, a “new paradigm” (Rome, 2013). However the public face of the first Earth Day masked a great deal of dissention between competing environmental interests. The New Left had grown disillusioned with the emerging environmental movement’s focus on wilderness preservation and limits to growth, professing that it blamed individuals for environmental problems rather than corporate polluters. Further, the first Earth Day de-emphasized issues of race and class and focused on environmental cleanup, instead of critiquing industrial

society itself. Also absent from the first Earth Day activities were established conservation groups such as the Sierra Club and the Audubon Society, who did not see a need for a “new paradigm” since, in their view, the strategies and tactics used by reputable groups had already proved effective. So while Earth Day is typically remembered as a grassroots movement based on a society-wide paradigm shift, in fact it represented a splintering of already established environmental interests (Rome, 2013).

Throughout the 1970’s and 1980’s, environmental organizations broadened their spatial scope, maintaining a focus on national legislation and policy while also paying more attention to local and international issues (Gottlieb, 1993; Bosso, 2005). With the growing recognition that CFC’s were damaging the atmosphere, environmental problems became increasingly global, affecting not just particular groups but the functioning of the planet as a whole. The 1987 Montreal Protocol demonstrated global cooperation to ban CFC emissions. There was also an increased awareness that the developed world and the developing world harbored different levels of responsibility for environmental degradation. As environmentalism grew throughout the 1980’s, the movement split into two broad tendencies: “mainstream” environmental groups, who focused on biophysical nature and often harbored strong ties to government organizations and industry, and “alternative” groups, who employed grassroots advocacy and increasingly addressed issues of class and race (Rome, 2013).

Given that many positions taken by environmental advocates are rooted in the sciences, environmentalism has always been strongly connected to academia. Soon after the 1969 Santa Barbara Oil Spill, the first Environmental Studies department was established at the University of California at Santa Barbara. The 1970’s saw the emergence of the field environmental sociology, instigated in large part by Dunlap and Van Liere’s and Catton and Dunlap’s critiques of industrial society and its perceived anthropocentrism (Freudenburg & Gramling, 1989). Throughout the 1970’s and 1980’s, environmental sociology broadened to include Marxism, as “eco-Marxists” re-analyzed Marx’s interpretation of the role of nature in systems of production (O’Connor, 1971; Schnaiberg, 1980). The 1970’s also saw the establishment of environmental philosophy, which included environmental ethics, environmental theory, ecofeminism, and environmental theology (Keulartz, 1999). In response to eco-Marxism, Schnaiberg (1980) proposed the

“treadmill of production” model, articulating the contentious relationship between capital, labor, and the state and how they threatened the health of the environment. Also influential was modernization theory, which argued that economic growth (via capitalism) and environmental protection were compatible if carefully planned using approaches like life cycle analysis, permaculture, and other forms of sustainable development (Spaargaren & Mol, 1992). Ulrich Beck and Anthony Giddens introduced the concept of the risk society in the late 1980’s and early 1990’s, arguing that environmental degradation represented a predictable and manageable risk, though eliminating that risk would require rejection of the political and economic structure (Beck, 1992; Giddens, 1991). In the meantime, environmental studies and sciences programs continued to be established at major universities around the country (Vincent & Focht, 2011).

Throughout the 1990’s, the environmental movement continued its focus on charismatic species, pollution, and land degradation. But increasingly eclipsing these individual issues was global climate change. In 1989 Bill McKibben published *The End of Nature*, which argued that the global reach of climate change meant that “nature”, as a place untouched by humans, was essentially gone (McKibben, 1989). This was mirrored in academia as the “social deconstruction” movement caused a minor upheaval. Many academics, couched within the broader cultural turn occurring in the social sciences, argued that nature was not a thing or location but rather a collection of ideas situated within time and space, and thus could not be understood without examining the broader social context in which those understandings were generated (Haraway, 1991; Wilson, 1993; Bennett & Chaloupka, 1993; Evernden, 1993; Soper, 1995; Braun & Castree, 2001).

Environmental historian William Cronon (1995) argued that wilderness was an idea, not a place, generated through classism and privilege. “Wilderness”, stated Cronon, “is so often conceived as a form of recreation best enjoyed by those whose class privileges give them the time and resources to leave their jobs behind and ‘get away from it all’” (Cronon, 1995, p. 373). Richard White made a similar argument in his essay, *Are You an Environmentalist or Do You Work for a Living?* (White, 1996). Fire historian Stephen Pyne (1997) demonstrated that “pristine” landscapes had been shaped by human-caused fires long before the arrival of Europeans. On the other side of the fence were scholars from the biophysical sciences (e.g., Soule & Lease, 1995), who felt that the social constructionists were distracting the public from the urgency of environmental problems. At

the same time, others stated that the arguments of the social deconstructionists were nothing new, as even before McKibben the “idea of nature” had been contested (e.g., Marsh, 1864; Glacken, 1967; Williams, 1982). Eventually this debate was tempered through soft constructionism, critical realism, and pragmatism, wherein landscapes themselves were recognized as ontologically “real”, though the associated epistemology was recognized as constructed (Hannigan, 1995; Proctor, 1998). During the 1990’s and 2000’s, land managers increasingly abandoned idealized concepts of pristine wilderness, arguing that conservation was no longer about “...preserving more fragments of pristine nature but renewing as much of the unreserved landscape as possible” (Minteer & Pyne, 2012). Restoration ecology continued to gain proponents as it was gradually recognized that landscapes may not reach ecological functioning without restrained, respectful human management (Hobbs, Hallett, Ehrlich, & Mooney, 2011).

By the early 2000’s, the environmental movement had become progressively more mainstream but was failing to achieve significant political victories. Some suggested that this was due to the increasing tendency of Americans to engage in individual behaviors like purchasing environmentally friendly consumer goods and recycling, while actions like donating to environmental groups and letter-writing decreased (Dunlap, 2010). Others argued that environmental problems faced by humanity were simply too magnanimous to overcome, leading to the publication of books like *Ten Billion* (Emmott, 2013) and *Vanishing Face of Gaia: A Final Warning* (Lovelock, 2009). Dystopians like Emmott and Lovelock employed sophisticated science to explain the impending ecological collapse, harboring little faith in environmental problem solving. Over the last 15 years, support for the environmental movement has become politically polarized (Jones, 2016). While other issues remain important, climate change continues to unite environmental groups, so much so that it prompted some to argue that it stymied progress on equally important issues like biodiversity loss (Crist, 2007). Others claimed that environmentalism’s lack of political progress should motivate serious reflection, even leading to declarations of its “death” (Shellenberger & Nordhaus, 2009). Despite these trends, throughout the 2000’s two thirds of college-level environmental studies and sciences programs reported growth (Vincent & Focht, 2011).

The concept of the Anthropocene has initiated another round of reflection about environmentalism's theoretical underpinnings. Nobel-laureate Paul Crutzen coined the term, arguing that the geologic record suggests that humans, rather than planetary forces, now constitute the largest influence on the planet (Crutzen, 2006). While the term hasn't yet been adopted, the Subcommission on Quaternary Stratigraphy has been considering its formal recognition, citing greenhouse gas accumulation, biodiversity loss, and biological homogenization (Steffen et al., 2011). The term has garnered prolific attention in both academia and the popular press (e.g., Crutzen, 2006; Minter, 2012; Proctor, 2013; Shellenberger & Nordhaus, 2011; Stoner & Melathopoulos, 2015; Wuerthner, 2014; Oelschlaeger, 2014; Hamilton, 2016; Luke, 2016). Some see popularization of the term as a rehashing of the social construction debates of the mid-1990's, as the Anthropocene "represents a very public challenge to the modern understanding of Nature as a pure, singular and stable domain removed from and defined in relation to urban, industrial society" (Lorimer, 2012, p. 1). On the Anthropocene, environmentalists have been broadly characterized as falling into two camps. The first are the "new conservationists" who embrace the Anthropocene as an opportunity for humans to bring about changes that positively impact the functioning of the earth's planetary processes, taking on responsibility for tending earth's "rambunctious garden" (Marris, 2013). The second group, dubbed "neoprotectionists", argue that Anthropocene supporters are "hijacking" traditional environmentalism (Sessions, 2014). To this group, the Anthropocene should not be embraced but rather recognized as the harbinger of an "unsettling reality" that emerged out of human hubris and arrogance (Oelschlaeger, 2014; Hamilton, 2016). Whether or not the term is ever formalized within geologic circles, has been widely recognized as a "paradigm shift" (Lewis & Maslin, 2015).

Today's environmentalism is characterized by heterogeneity, with respect to organizational type, scale, and social change strategy. While this poses challenges, visible diversity is also a strength for a movement long characterized as elitist. One of the most prominent activist groups within contemporary environmentalism is the environmental justice movement which, while not unproblematic (e.g., Shellenberger & Nordhaus, 2007; Davidson, 2003) has revitalized the connection between quality of life and environmental concerns that characterized the environmentalism of the early 1960's (Bullard, 2000). Demand for

environmental studies programs in higher education has grown, with universities responding accordingly (Vincent & Focht, 2011). The international agreements reached at the 2015 Paris Climate Change Conference have been largely heralded as a success, while previous efforts to agree on emissions targets failed (i.e. Kyoto 1997, Copenhagen 2009). At the same time, affiliation with the term “environmentalist” has decreased significantly, from 76% of Americans identifying as an environmentalist in 1989 to 42% in 2016 (Jones, 2016). Concern about environmental problems has decreased (Jones, 2015), and attitudes towards climate change have become proxies for political affiliation (Kahan et al., 2012). Even more consequentially, many argue that the 2016 election of President Donald Trump will be a dramatic setback for the health of the environment (Kolbert, 2016; Roberts, 2016).

Measuring Environmental Worldviews

It was out of the mainstream environmental narrative of the 1960’s that the New Environmental Paradigm Scale (NEP) emerged (Dunlap & Van Liere, 1978). Today, the scale consists of 15 question items that measure five dimensions of environmental thought: (1) belief in an inherent balance of nature, (2) the existence of fundamental limits to growth, (3) anti-anthropocentrism, (4) rejection of human exceptionalism, and (5) the possibility of an impending ecological crisis (see Appendix A). The precursor to the NEP, the “Concern for Environmental Rights” scale, was developed by sociologist Riley Dunlap as he surveyed “eco-activists” and undergraduates at the University of Oregon (Dunlap, Gale, & Rutherford, 1973). As Dunlap read from the canon that informed the dominant environmental discourse of the late 1960’s (“the likes of Barry Commoner, Paul Erlich, and Garrett Hardin” and the “preservationist perspective of John Muir...and Aldo Leopold”) he experienced a change in worldview (Dunlap, 2008, p. 6). Dunlap believed that there was a society-wide transformation occurring, similar to the paradigm shift described by Thomas Kuhn with respect to science (Kuhn, 1962). The “Dominant Social Paradigm”, focused on economic growth, individual and property rights, and faith in technology, was being supplanted by a “New Environmental Paradigm” characterized by “the existence of ecological limits to growth, the importance of maintaining the balance of nature, and rejection of the anthropocentric notion that nature exists primarily for human use” (Dunlap,

2008, p. 6). After Dunlap's hire at Washington State University in 1972, he and Kent Van Liere developed a questionnaire that operationalized both the "dominant social paradigm" and the "new environmental paradigm", tapping the "major themes found in environmental literature" to develop the question items (Dunlap, 2008, p. 6). In 1976 they fielded this survey with Washington State residents (including an oversample of ecologists and "environmentalists") to develop what eventually became the 12-item New Environmental Paradigm scale (Dunlap, 2008).

Before the NEP became dominant, there were two other popular quantitative scales— the Ecology Scale (Maloney & Ward, 1973) and the Environmental Concern Scale (Weigel & Weigel, 1978). While all three scales measured attitudes, values, and behaviors, the latter two contained questions addressing specific environmental problems of the era, subsequently making the scales dated (Milfont & Duckitt, 2010). The NEP's lack of reference to explicit issues made the scale applicable as the environmental movement focused more and more on international concerns. By the mid-1980's, the NEP was increasingly incorporated into individual studies and social-psychological theories (e.g., Stern and Dietz's Value Belief Norm theory). In the late 1980's, Dunlap published a shortened version of the scale consisting of the six most explanatory items to make it more easily fielded by social scientists. This increased its popularity amongst researchers (e.g., Pierce & Lovrich, 1980; Pierce, Lovrich, Tsurutani, & Abe, 1987). In 1990, Dunlap substantively modified the NEP, adding and validating questions to reflect two emergent concerns; (1) the degree to which respondents felt that humans were limited by planetary boundaries, and (2) catastrophism (Dunlap, 2008). This first addition was inspired by Dunlap's own attitudinal research on planetary boundaries (Catton & Dunlap, 1980), though the concept had existed various forms since the 1970's (e.g., Meadows, Meadows, Randers, & Behrens, 1972; Lovelock, 1979). Because "the notion of ecological crisis has become more credible", Dunlap included the "likelihood of eco-crises" in the revised scale (Dunlap 2008, p. 9). This addition reflected the increasing sophistication of climate modeling, which was recognized as both validating the threat of climate change while introducing uncertainty as to when its effects would be irreversible. To better reflect the NEP's roots in

the “ecological sciences”, it was renamed the New Ecological Paradigm scale (Dunlap, 2008)¹. The NEP now contains these five sub-constructs; (1) the respondent’s belief in an inherent balance of nature, (2) the existence of fundamental limits to growth, (3) anti-anthropocentrism, (4) the rejection of human exceptionalism, and (5) the possibility of an impending ecological crisis. Since, it has been incorporated in numerous models of environmental attitudes, values, and behaviors, and endorsed by a variety of disciplines (e.g., Albrecht, Bultena, Hoiberg, & Nowak, 1982; Arcury, Johnson, & Scollay, 1986; Corral-Verdugo & Armendariz, 2000; Dietz, 2015; Noe & Snow, 1990; Shephard et al., 2015; Wiidegren, 1998).

The NEP has been repeatedly tested and critiqued, as discussed by Dunlap in his 2008 paper, *The New Environmental Paradigm Scale: From Marginality to Worldwide Use*. For one, Dunlap and Van Liere failed to adhere to social-psychological theories of attitude structure and subsequently the NEP is employed alternately as a measure of beliefs, attitudes, values and worldviews (Milfont & Duckitt, 2010). A second issue is that how the scale is fielded affects its explanatory power. A widespread lack of standardization (i.e. variations in sample type, scale length, modification of item content) has produced divergent results and limits the ability of the outcomes of studies to be compared (Hawcroft & Milfont, 2010). Another long-debated issue focuses on the NEP’s single higher-order factor structure. The scale’s unidimensionality has been defended by Dunlap and others (e.g., Dunlap, 2008; Davidson, 2003; Pierce & Lovrich, 1980; Xiao & Dunlap, 2007), but in certain instances the NEP breaks out into its five sub-constructs (e.g., Albrecht, Bultena, Hoiberg, & Nowak, 1982; Geller & Lasley, 1985).

Also challenged, albeit less regularly, is whether the scale captures what it purports to capture- the theoretical underpinnings of an increasingly diverse environmental movement. LaLonde and Jackson (2002) used open-ended surveys to show changes in the nature of environmental problems and how the public’s understanding of them has become increasingly sophisticated. This includes the emergence of global climate change as a central organizing issue and the development of radical groups like EarthFirst!. Research has also shown that Dunlap and Van Liere’s environmentalism is occasionally lost in translation, insofar as there have

¹ Both names, the New Environmental Paradigm Scale and the New Ecological Paradigm Scale, remain in use today. To maintain consistency with the history of the NEP, the original name is used in this project.

been difficulties with question comprehension and lower levels of internal consistency when the NEP is fielded outside the United States (e.g., Chatterjee, 2008; Gooch, 1995; Schultz & Zelezny, 1998). Recently, the theoretical assumptions of the scale have been addressed more directly. Kopnina states, “In (the) NEP, nature is seen as a limited resource, delicately balanced and subject to deleterious human interference” (Kopnina, 2011, p. 1026). Lundmark (2007) examines the NEP within the broader ethical landscape and argues that while the scale adequately captures anthropocentrism, it does not address “deep green” concerns. This has prompted some to suggest that the NEP be retired. State LaLonde and Jackson (2002),

It is clear that the NEP scale, as it currently is constructed, has outlived its usefulness. It has been very effective in determining the extent to which different populations have rejected the so-called dominant social paradigm and adopted a new environmental paradigm. However, it is no longer effective for shedding light on the components of that paradigm. If it is to continue to be a useful research tool, it will need to reflect more adequately current environmental attitudes and their complexity (LaLonde & Jackson, 2002, p. 1).

There are multiple alternative typologies for assessing environmental worldviews, and while some better illustrate environmentalism’s diversity, they remain problematic. Many share the NEP’s unidimensionality: ecological consciousness (Ellis & Thompson, 1997; Thompson & Barton, 1994; Dobson, 1998), shallow to deep ecology (Devall, 1980), utilitarianism to preservationism (Nash, 1982), bright green to dark green to light green to gray (Steffen, 2004), and brown to light green to dark green (Nadasdy, 2005). While multidimensional measures broaden the scope, all have their drawbacks. Merchant’s egocentrism, homocentrism, and ecocentrism (Merchant, 1980) and Dryzek’s survivalism, environmental problem solving, sustainability, and green radicalism (Dryzek, 1997) are thought exercises rather than empirically validated scales (Proctor, 2016). Kellert’s nine attitudinal groupings are limited to wildlife (Kellert, 1987; Kellert, 1985). More comprehensive is Esbjörn-Hargen’s Integral Ecology scale (Esbjörn-Hargens, 2009), but it can be reduced to a two-dimensional opposition between interior/exterior and collective/individual (Proctor, 2016). Recently, Nisbet developed a three-group taxonomy of public intellectuals with respect to their views of climate change (Nisbet, 2014). The Environmental Attitudes Inventory (EAI) is arguably the most systematically developed and robust alternative to the NEP (Milfont & Duckitt, 2010). Milfont and Duckitt aggregated numerous environmental attitude scales and addressed many of the NEP’s analytical issues. But

with 12 orthogonal constructs containing 10 question items each, the EAI is impractical to field for many researchers, even in its short form (6 constructs, 72 total items). Further, even this typology can be reduced to a single-order higher factor structure (Proctor, 2016). Ultimately, all alternatives harbor issues similar to the NEP, relying heavily on binaries or not empirically validating multi-dimensional approaches to pro-environmental thought.

Research questions

One approach to updating a well-vetted yet problematic measurement of a psychological construct would be to field a national survey. This approach could, however, be presumptive given the diffuse nature of contemporary environmentalism. The goal of this project was to inform further research in order to increase the chances of developing a scale that successfully measures the desired phenomenon. Rather than reject the New Environmental Paradigm scale (and other scales like it) the objective of this project was to deeply explore a carefully chosen group of environmentalists to determine which aspects of the NEP deserve retention, which no longer unite environmentalists, and what might be added. The following questions guided the project:

- Q1 Which dimensions differentiate the worldviews of contemporary environmentalists?
- Q2 Are differences in environmentalist worldviews related to demographic variables?
- Q3 Can environmentalist worldviews be grouped in ideologically coherent ways?
- Q4 Does the existing New Environmental Paradigm scale capture the breadth of contemporary environmental worldviews?
- Q5 Which aspects of the NEP scale deserve to be retained, revised, or removed?

Research Design

General approach

This research employs approaches from multiple disciplines, namely environmental sociology, conservation psychology, and human geography (humanism and behavioralism). These disciplines share a focus on the human-environment relationship. Environmental sociology, developed by Dunlap and Catton, looks at the society-level interactions between humans and the biophysical environment (Freudenburg &

Gramling, 1989). Conservation psychology is similar to environmental sociology, but focuses on the role of the individual using traditional social-psychological methods (Clayton & Myers, 2009). Humanism and behavioralism within human geography approach human-environment relationships quite differently. Humanism focuses on the central role of human agency and awareness, looking at subjective experiences of place and how places are socially constructed (Entriken, 1976). Behavioralists examine how people process geographic information into attitudes, beliefs, and behaviors, with contemporary research employing positivistic methods to find underlying laws of behavior (Castree, 2005). Conservation psychologists and behavioralists have been accused of hyper-focusing on the individual, overemphasizing the role of human agency, and giving only cursory value to social and institutional constraints. Further, conservation psychologists have been accused of tasking individuals with solving environmental problems through individual behaviors, while many environmental issues are perpetuated at a much larger scale (Hobson, 2008). Humanists take issue with the positivistic model employed by psychologists and behavioralists, in which laws and theories explain observed phenomenon. Behavioralists retort that their approach is over-generalized; while behavioralism seeks to find underlying laws of behavior, it is understood that they are probabilistic, not deterministic (Castree, 2005).

This research project recognizes both the usefulness and incompleteness of positivistic and qualitative approaches. While quantitative surveys like the New Environmental Paradigm scale can measure the presence of a construct in society at a given point in time, this approach fails to illustrate the contradictory and shifting nature of attitudes, values, and beliefs. It does not communicate the lived experience of an individual, where one evaluates information in light of new experiences and changes accordingly. At the same time, in-depth, non-representative samples do little to speak to the shared values between respondents, and the conclusions lack replicability and falsifiability. To maximize the benefits of both approaches, a two-stage methodology was employed; (1) quantitative data collection, and (2) in-depth Repertory Grid interviews. The first stage used traditional survey research methods, which was later used to make generalizations about the sample as a whole. The second stage employed open-ended structured Repertory Grid interviews wherein the respondents volunteered both the constructs and elements, reducing the risk of priming by the interviewer.

The first stage used quantitative data to provide breadth, while the second stage used a combination of quantitative and qualitative approaches to add depth.

Sampling Approach

This project was designed to inform future research at the population level and the sample was not intended to be demographically representative of the general population. The population was, however, carefully chosen to reflect the known characteristics of contemporary environmentalism based on analysis of contemporary environmental discourse (Bernstein & Szuster, forthcoming). The sample recruitment approach could be described as non-probability sampling. Non-probability samples are selected based on the knowledge of the researcher, rather than through random chance (probability sampling) (Trochim, 2006). More precisely, purposive sampling (or judgmental sampling) was employed to select participants who possess specific characteristics. The goal of purposive sampling is not proportionality or representativeness, but to rather to ensure that the sample exhibits a particular commonality (in this case, pro-environmental worldviews) (Saunders, Lewis, & Thornhill, 2012). Once respondents with pro-environmental worldviews were identified, maximum variability sampling was used to select participants. Maximum variability sampling is the selection of participants who exhibit heterogeneity, and to fully understand a group of interest, the widest range of views is sought (Cohen & Crabtree, 2006).

With respect to sample size, there are no "hard rules" about determining the correct sample size in qualitative research (Patton, 1990). Sandelowski states that, "determining adequate sample size in qualitative research is ultimately a matter of judgment and experience" (Sandelowski, 1995, p.179). Studies using the Repertory Grid technique are typically small due to the amount of time it takes to collect information during interviews and analyze and interpret the data. Data collection can also become redundant after a certain number of interviews (Jankowicz, 2005) and a well-constructed sample of 15 to 25 participants will frequently generate sufficient constructs to approximate the 'universe of meaning' regarding a given domain of discourse (Tan & Hunter, 2002). This implies that no new constructs are uncovered even if the sample size is increased,

though this was not the case here given that participants volunteered the constructs and elements. Based on the above, a sample size of 22 was deemed appropriate for this study.

Personal Construct Theory and Repertory Grid

The interviewing method used in this study is based on Personal Construct Theory (PCT) which emerged within the field of cognitive psychology. The theory was developed by American psychologist George Kelly, who was influenced by phenomenology despite his skepticism of it (Boeree, 2006). The model is unique within psychology because it does not ascribe individuals with a particular set of attributes, but rather captures the processes through which people structure and comprehend their world. Central to Personal Construct Theory is the assumption that humans possess working theories about the world. Underlying these working theories are core constructs, or non-verbalized meanings that form an individual's ultimate sense of self (Neimeyer & Bridges, 2003). Individuals act on the basis of these working theories, with their actions serving as hypothesis testing. New information is sorted into coherent units rendering a seemingly chaotic world interpretable (Bannister & Fransella, 1977). Personal Construct Theory also states that individuals evaluate new information by using dichotomous poles, creating meaning by identifying contrasts. These contrasts, termed constructs, are applied to nearly everything. An affinity for one end of a dimension or another provides information about how a person engages with the world, giving rise to how they self-identify within society as a whole (e.g., liberal vs. conservative). A benefit of Personal Construct Theory, when used in a research setting, is that it does not place the researcher in a superior position to the individuals being studied (Neimeyer & Bridges, 2003). The methodology allows researchers to understand the individual from their own perspective; the role of the researcher in directing data collection is minimized when compared to techniques like surveys or structured interviews (Whyte & Bytheway, 1996).

Personal Construct Theory has been critiqued on a number of bases. For one, it is seen as overly cognitive, not allowing for affective and subjective expressions by participants. Kelly acknowledged emotions as the experience of transitioning from one way of seeing the world to another, and emerging when our constructs do not match our external experience of reality and thus generating cognitive dissonance.

Nevertheless, the actual process of gathering data from a participant makes capturing these experiences challenging (Boeree, 2006). Kelly is also critiqued for not affiliating with other branches of psychology, instead developing new terms and concepts with little reference to established practices. While these critiques have merit, none are strong enough to invalidate PCT, which remains well-respected within the field of psychology and beyond (Boeree, 2006).

The Repertory Grid technique was developed by Kelly to apply Personal Construct Theory within a research setting. While originally used in clinical psychology, the Repertory Grid interviewing technique has increasingly been utilized in education (Beail, 1985; Bezzi, 1999; Zuber-Skerritt, 1992), marketing (Rogers & Ryals, 2006; Tan & Hunter, 2002), and tourism research (Coshall, 2000; Embacher, 1989; Pike, 2003). Bannister and Fransella describe the technique as a special form of a structured interview; Jankowicz describes it as a rating procedure (Bannister & Fransella, 1977; Jankowicz, 2005). There are four features of a repertory grid: a topic, elements, constructs, and ratings. The topic is the part of the world to which the interview applies, and for the interview to be successful the respondent must possess experience with the topic within their “personal repertoire” (Jankowicz, 2005). Elements show how participants characterize a topic, as they represent the participant’s personal sample of instances within that particular topic area. Constructs indicate how participants make sense of a topic. A core aspect of Kelly’s theory is that an individual makes sense of the world using contrasts rather than absolutes. Subsequently, the Repertory Grid interview process elicits constructs as dichotomous poles. Once both the elements and constructs are elicited, the elements are ranked on the basis of the constructs, generating a mental map of how the respondent characterizes the topic.

Content Analysis

Repertory grids are typically analyzed quantitatively using techniques such as principle component analysis and cluster analysis. Content analysis is less regularly used despite the potential benefits (Green, 2004). States Krippendorff, “Content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use” (Krippendorff, 2004). Given

that this project allowed participants to volunteer both the constructs and the elements, content analysis permitted generalization across the sample. With respect to the content analysis process, a data driven (rather than a theory driven) approach was chosen. This helped avoid researcher bias in category development, plus pre-existing sets of codes were not applicable to the data set (see Green, 2004). Descriptive coding, which summarizes the content, was used because of the multiple ways in which solutions were described by participants (see Saldana, 2009). The bootstrapping technique was employed to generate the initial content analysis categories, wherein the constructs were examined systematically for the themes they represented. Each item was then compared with other items for similarity, and when dissimilar, a new content category was created. If an item did not fall into previously established categories, a new category was created. Items that were unclassifiable (meaning a category would include only a single item) were categorized as “Miscellaneous” (for more on bootstrapping, see Jankowicz, 2005). The primary researcher and a secondary coder unfamiliar with the objective of the study each coded the data independently. Each pole was treated as an individual data unit for the constructs, and each coder assigned codes independently before discussing and subsequently refining the codes. Each independent coder conducted a second round of coding using these refined codes.

Data Analysis Techniques

Quantitative data analysis techniques were used to analyze the Likert-type scale questionnaire data, content analysis, and the individual repertory grids. Cluster analysis is a statistical procedure wherein data points are grouped using a number of input variables so that the groups are internally similar and distinct from the other groups (Kaufman & Rousseeuw, 2005). Given that cluster analysis is typically an exploratory data analysis tool, it fit the objective of this research as the groupings are meant to prompt further inquiry. While there are a number of clustering techniques, kmeans and hierarchical clustering are most appropriate for the data set. Kmeans clustering was selected for its flexibility, per Hayashi (2016). Principle component analysis is a type of factor analysis that uses interrelationships between variables to determine the structure underlying a data set. The objective is to take a large amount of variance and reduce it into a smaller number

of variables called principle components (PC's). The level of correlation between rows of data is computed and ordered based on the amount of variance they explain (PC1, PC2, etc.). In this study, it was used to identify the underlying dimensionality of individual repertory grids.

Dissertation Organization

The first paper (Chapter 2) is theoretical in nature. It chronicles the development and establishment of the NEP and the important role it has played in social science research. It also reviews key empirical and theoretical critiques of the scale, arguing that the worldview embodied by the NEP is representative of a narrow interpretation of pro-environmental thought. Based on an assessment of contemporary environmental discourse, the paper theorizes that the key areas in which environmentalists differ from one another are with respect to nature, technology, and scale of societal response. Ultimately, it concludes that the NEP would erroneously categorize many contemporary environmentalists as not harboring strong pro-environmental values. On this basis, the paper argues that the NEP should be reassessed as to its strengths and weakness in order to preserve the aspects that have proved powerful while re-examining and revising the aspects that no longer accurately capture contemporary environmentalism.

The second paper (Chapter 3) is a research paper. It builds on the first paper (Chapter 2) by empirically evaluating the assertion that contemporary environmentalists hold heterogeneous views of issues of nature, technology, and scale of societal response. The paper discusses the solutions proposed by a diverse group of contemporary environmentalists with respect to addressing climate change, and quantifies the way in which the participants differentiated between various solutions. Further, it explores how the solutions suggested by participants differed by age. The analysis demonstrates that the group of environmentalists studied were far from ideologically homogenous. While they agreed with respect to certain issues, such as the seriousness of environmental problems and the inability of the earth to accommodate unlimited resource demands, they also disagreed in key areas, such as the capacity for technology to solve environmental problems and the scale at which effective change occurs. With respect to effective environmental problem solving, respondents offered green technologies, reducing resource consumption, and policy changes, and

they differentiated between these solutions based on cost, the type of social change needed to bring these solutions to fruition, and how difficult they would be to enact. Younger respondents were more likely to mention green technology and alternative transportation, while older respondents discussed individual political engagement and education and awareness. Overall, Paper 2 helps identify the aspects of the NEP that remain effective while identifying other areas that deserve further exploration.

The third paper (Chapter 4) is a research paper that groups environmentalists on the basis of their shared worldviews, suggesting that they fall into four key ideologically coherent groups. The paper goes on to provide in-depth analysis of the attitudes, values, and worldviews of each group and its individual members using multiple methodologies and scales. Three of the groups resemble those found in previously established typologies (e.g., Nisbet, 2014). These include Pragmatic Reformers, who harbor strong levels of concern about environmental problems but pursue change through the pre-existing social and economic structures. Activist Greens are the heirs to mainstream early 1970's environmentalism and support grassroots action and political engagement. Ecomodernists are optimistic about environmental problem solving and support large-scale technological interventions. The fourth group, Ecofatalists, are extremely convinced of the urgency of environmental problems, but are also deeply skeptical of the ability of structural solutions to address their concerns effectively. While this group engages in individual pro-environmental behaviors, it is in reaction to the ineffectiveness of larger-scale actions as opposed to being proactive or optimistic. These four groups comprise a suggestive typology that merits further exploration at the national population level.

Summary

Quantitative analysis and research must be informed by a systematic review of both academic research and, depending on the topic, popular discourse. Before contemporary environmentalism can be operationalized, there must be a thorough investigation of the theoretical divergence and coherence within the movement itself. Failing to conduct this type of comprehensive review has hampered the development of multi-dimensional alternatives to the NEP. Chapter 2 (Paper 1) addresses this shortcoming through a broad assessment of contemporary environmental discourse and identifies three key dimensions (nature, technology,

and scale of societal response) that were posited to structure how contemporary environmentalists understand current environmental problems and solutions. These suggested dimensions are used as hypotheses throughout the rest of the research, with full recognition that any new scale will inherently be situated within its broader social, economic, environmental, and political context.

CHAPTER 2

PAPER 1: A RENEWED ENVIRONMENTAL PARADIGM: REASSESSING THE OPERATIONALIZATION OF CONTEMPORARY ENVIRONMENTALISM

Introduction

The New Ecological (formerly Environmental) Paradigm scale, introduced in 1978, remains the most widely used quantitative measure of environmental worldviews (Dunlap & Van Liere, 1978), and its contribution to social science research cannot be underestimated. It was developed at a time when environmental problems were just beginning to be understood by the general public and popular discussions of environmental ethics were novel. Since its inception, it has been incorporated in powerful models of environmental attitudes, values, and behaviors (i.e., Stern and Dietz's value belief norm theory) (Stern & Dietz, 1994), and is utilized by a variety of disciplines (e.g., Albrecht, Bultena, Hoiberg, & Nowak, 1982; Arcury, Johnson, & Scollay, 1986; Corral-Verdugo & Armendariz, 2000; Dietz, 2015; Noe & Snow, 1990; Shephard et al., 2015; Wüdegren, 1998). A Web of Science search shows a total of 2,332 uses of the terms "new environmental paradigm scale" and "new ecological paradigm scale", with Dunlap's revised scale (Dunlap, 2008) receiving 412 citations between 2014 and 2016 alone.

Given its prominence, it's unsurprising that the NEP has been regularly examined and critiqued. Certain weaknesses emerge more frequently, many of which Dunlap himself systematically addresses (see Dunlap, 2008). For one, Dunlap and Van Liere failed to conform to social-psychological theories of attitude structure and thus the NEP has been treated alternatively as a measure of beliefs, attitudes, values and worldviews. This, however, has not stopped it from providing a useful explanatory construct in multiple studies, despite its reliance on "folk" ecological theory (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Second (and admittedly beyond the power of Dunlap et al. to address) is that the way the scale is fielded affects its explanatory power. Not only are there multiple versions of the scale (original, shortened, revised, and children), but researchers often modify the question items to serve their own purposes. This widespread lack of standardization (variations in sample type, scale length, modification of item content) has produced

divergent results and limits the ability of the outcomes of studies to be compared (Hawcroft & Milfont, 2010). More recently, Piennar et al. found that NEP scores vary according to other content included in surveys, such as the respondent's level of concern for individual species (Pienaar, Lew, & Wallmo, 2015). Another long-debated issue focuses on the NEP's single higher-order factor structure. The scale's unidimensionality has been defended by Dunlap and others (e.g., Dunlap, 2008; Pierce & Lovrich, 1980; Xiao & Dunlap, 2007), but in certain instances the NEP breaks out into its five sub-constructs (e.g., Albrecht, Bultena, Hoiberg, & Nowak, 1982; Geller & Lasley, 1985). Dunlap recognizes these issues, and recommends fielding the revised scale and, through data analysis, determining whether it should be considered unidimensional or multidimensional (Dunlap, 2008).

Other critiques, though less in number, challenge the theoretical underpinnings of the scale, specifically with respect to what type of environmentalism the scale purports to measure. LaLonde and Jackson (2002) used open-ended surveys to show changes in the nature of environmental problems and a public whose understanding has become increasingly sophisticated. Some of the changes LaLonde and Jackson identify include awareness of unequal global resource distribution, the emergence of global climate change as a central organizing issue, and the development of radical new ideological groups like EarthFirst!. Dunlap (2008) addresses this study but refutes it on the basis of its sample, which consisted of "intelligent experts" who, as he states, do not reflect the worldviews of the general population. Third, research showed that were difficulties with question comprehension and lower levels of internal consistency when the NEP was fielded in Eastern Europe and Latin America (e.g., Chatterjee, 2008; Gooch, 1995; Schultz & Zelezny, 1999), which Dunlap himself states warrants further research (Dunlap, 2008). Recently, the ideological underpinnings of the scale have been addressed more directly. Kopnina states, "In [the] NEP, nature is seen as a limited resource, delicately balanced and subject to deleterious human interference" (Kopnina, 2011). Lundmark (2007) examines the NEP within the broader ethical landscape and argues that while the scale adequately captures anthropocentrism, it does not address "deep green" concerns.

Hence the case has been made that the NEP, statistically valid as it may be, erroneously conflates a single, situated, pro-environmental worldview with environmentalism generally. Survey research has inherent

challenges, such measuring broad concepts through examples and the way in which question items are interpreted differently by respondents (King, Murray, Salomon, & Tandon, 2009). Environmentalism is a worldview that is fundamentally in flux, shaped by the broader social, environmental, and political context of that point in time. No scale will ever fully capture internal differentiation between groups, much less within them. But if the ongoing use of the NEP is any example, there is a need for assessing pro-environmental worldviews in a way that is concise, reliable, and robust. It connects attitudes with behaviors, allows for generalization across groups, and can measure attitudinal changes over time. There is demand for a quantitative scale that does what the NEP purports to do, though it should be recognized as the product of a particular place and time and its inherent limits and drawbacks are taken into account. This paper attempts to identify the underlying dimensions that differentiate contemporary environmentalists in order to lay the foundation for a scale with improved construct validity.

Background

The mainstream environmental movement is said to have been born at various points in time including the 1969 Santa Barbara Oil Spill, the 1969 Cuyahoga River Fire, the 1972 “Blue Marble” photograph, and Lynn White’s article attributing environmental problems to an anthropocentric Judeo-Christian worldview (White, 1967). A supportive ideology was seemingly needed and the canon was assembled. This included Aldo Leopold’s *Sand County Almanac*, Garrett Hardin’s *The Tragedy of the Commons*, Rachel Carson’s *Silent Spring*, Paul Erlich’s *Limits to Growth*, and Roderick Nash’s *Wilderness and the American Mind* (Minteer & Pyne, 2012). The values represented by these (mostly) white, well-heeled fathers of environmentalism— anti-anthropocentrism, sanctity of nature, importance of wilderness, and hard limits on population size— were conceived of as a “paradigm shift” separate from other social and political projects. Dunlap himself was reading from this canon in the late 1960’s, and came to believe that environmentalism represented an emergent shift in the social paradigm. Dunlap and his research assistant Kent Van Liere theorized that attitudes toward individual environmental problems grew out of a broader set of “primitive beliefs” about the relationship between humans and the earth (Dunlap, Van Liere, Mertig, & Jones, 2000).

Inspired by the work of Pirages and Ehrlich (1974), they saw environmental problems as caused by mainstream society harboring an anti-environmental “Dominant Social Paradigm” (DSP) characterized by anthropocentrism, pursuit of economic growth, and support for technological solutions. In creating the question items that eventually formed the NEP, Dunlap tapped major existing themes found in environmental literature, namely “the existence of ecological limits to growth, the importance of maintaining the balance of nature, and rejection of the anthropocentric notion that nature exists primarily for human use” (Dunlap, 2008, p. 6).

But environmentalism was already more unsettled than assessed by Dunlap and company. Environmentalists just a few years prior focused less on wilderness preservation and more on corporate control and quality of life concerns. Earth Day, the first public declaration of environmentalism’s coherent voice, was in fact boycotted by at least two distinct groups- social-justice leftists who felt that environmentalism blamed individuals for environmental problems, and established conservation groups such as the Sierra Club and the Audubon Society, who did not see a need for a “new paradigm” since, in their view, the strategies and tactics used by established groups had already proved effective (Gottlieb, 1993). The media attention heaped on the first Earth Day, and the singular version of environmentalism it represented, hid its diverse origins. Environmentalism appeared to have emerged as a singular “new paradigm”, effectively leaving out groups advocating for environmental issues from within a different ideological framework.

Dunlap revised the NEP in the 1990’s, adding and validating sub-constructs to reflect two emergent concerns (Dunlap, 2008). The first measured the degree to which humans were limited by planetary boundaries (Catton & Dunlap, 1980), and the second was associated with planetary tipping points and catastrophism. The resulting revised scale, now with five sub-constructs, was renamed the New *Ecological* Paradigm scale by Dunlap to more closely link it with ecological science. But these amendments did not expand the scale to include radically different views of environmentalism, rather they included other constructs that the original group would endorse.

Other Quantitative Measures of Environmentalism

There is no shortage of alternative taxonomies for quantitatively assessing environmental worldviews, all of which employ different categorical elements. These taxonomies range dramatically in scope, from unidimensional scales to scales that encompass more than 200 dimensions. There are linear measures, including ecological consciousness (Ellis & Thompson, 1997), anthropocentrism to ecocentrism/ecologism (Eckersley, 1992; Dobson, 1998; Thompson & Barton, 1994), shallow to deep ecology (Devall, 1980), utilitarianism to preservationism (Nash, 1982), bright green to dark green to light green to gray (Steffen, 2004), and brown to light green to dark green (Nadasdy, 2005). Multidimensional measures are equally prevalent, including egocentrism, homocentrism, and ecocentrism (Merchant, 1980), Kellert's nine wildlife-related attitudes (Kellert, 1987; Kellert, 1985), Dryzek's survivalism, environmental problem solving, sustainability, and green radicalism (Dryzek, 1997) and Nisbet's ecological activists, smart growth reformers, and Ecomodernists (Nisbet, 2014). Even more comprehensive is Esbjörn-Hargens Integral Ecology scale (Esbjörn-Hargens, 2009) that includes 200 schools of ecological thought, and Milfont and Duckitt's Environmental Attitudes Inventory (EAI) that incorporates twelve scales with 120 total question items (Milfont & Duckitt, 2010). Some of these scales have been operationalized and validated while others remain descriptive. The EAI is arguably the most systematic and robust alternative to the NEP, insofar as Milfont and Duckitt (2010) aggregated the content of numerous other environmental attitudes scales and addressed many of the analytical issues associated with the NEP. Despite multiple critiques of the narrowness of the NEP's characterization of environmentalism, alternative quantitative scales have primarily focused on rectifying its analytical issues. Thus, many other possibilities attempt to operationalize environmentalism without a thorough investigation of divergence and coherence within the movement. Through a broad survey of contemporary environmental discourse, this paper proposes that three dimensions have the ability to encompass the key ways in which contemporary environmentalists agree and disagree- view of nature, technology, and society.

View of Nature

Perhaps unsurprisingly, a primary factor that differentiates pro-environmental worldviews is the character of “nature” itself, along with its inherent value and proper use. This ranges from the view that nature is a limited resource that should be treated delicately and with reverence to the view that nature is abundant, can be restored, and/or can thrive through appropriate management. The intellectual roots of the “limited/delicate” end of the spectrum are found in the Transcendentalists (i.e., Emerson, 1836; Thoreau, 1854) with wild places symbolizing Edenic respites from modern life. From this perspective, untouched nature is sacred and human interaction must be limited for risk of degrading its purity. A high score on the NEP endorses a “limited/delicate” view of nature with questions such as “the balance of nature is very delicate and easily upset” and “when humans interfere with nature, it often produces disastrous consequences”. Contemporary supporters of this perspective include public intellectuals like Bill McKibben, David Suzuki, Clive Hamilton, and Naomi Klein (Nisbet, 2014).

At the other end of the dichotomy are those who not only see nature as abundant and resilient in the face of human interaction, but question the existence of a non-human nature. The idea of a nature apart from humans has been widely challenged (e.g., Marsh, 1864; Glacken, 1967; Wilson, 1993; Haraway, 1991; Bennett & Chaloupka, 1993; Evernden, 1993; Soper, 1995; Braun & Castree, 2001; Habgood, 2002). Steven Pyne has written extensively about the ways in which seemingly “pristine” landscapes have been shaped by human use of fire, showing that the othering of nature as a pristine, untouched place apart from everyday life is historically and culturally situated (Pyne, 1997). The relatively new concept of the Anthropocene has reinvigorated the critique of pristine nature, suggesting that humans have replaced biological and geologic forces as the primary drivers of planetary change (Crutzen & Steffen, 2003). Consequently, the Anthropocene “represents a very public challenge to the modern understanding of Nature as a pure, singular and stable domain removed from and defined in relation to urban, industrial society” (Lorimer, 2012, p. 1). Some embrace this vision of a human-altered planet, seeing it as an opportunity for humans to engender changes that positively impact the earth’s processes. Others see the Anthropocene as evidence of the negative

implications of human involvement in planetary systems, and view it as the type of egoistic thinking that brought about large scale environmental problems in the first place (Nixon, 2014).

There is also the viewpoint that humans could responsibly engage with the biophysical environment if they had “moral restraint and moral regard for nature” (Minteer, 2012). This comes from the growing recognition amongst those who prefer to think of nature as pure and wild that a solely hands-off approach may not be practical. Given the amount of land that has been altered by humans, the focus “...is not about preserving more fragments of pristine nature but renewing as much of the unreserved landscape as possible” (Minteer & Pyne, 2012). Ecomodernists, citing Stewart Brand’s infamous quote, “we are as gods and might as well get good at it” (Brand, 2010), argue that humans are not limited to minimizing harm but rather can actively pursue a strategy of positive planetary change. Accordingly they embrace a wide range of large-scale projects meant to address global climate change and engender global prosperity.

View of Technology

E.F. Schumacher (1973) famously stated that “small is beautiful”, and the dominant environmental narrative largely eschews technology, characterizing it as the problem rather than the solution. The mainstream narrative portrays technology as an enabler of the capitalist economic system, whose need for continual expansion is antithetical to environmental problem solving. Industrialization is viewed as culpable in global climate change, deforestation, species loss, and other problems. These environmentalists (Nisbet’s environmental activists, Dryzek’s green radicals, Devall’s Deep Ecologists) share the belief that environmental problems will be solved through less technology, not more. Even when technology is able to save species or restore an area’s ecological functioning, it should not be “conflated with what was lost” (Kolbert, 2012). When technology absolutely must be deployed, it should be done so with moral reflection and a firm grasp of the precautionary principle. This group also fears that the spatially and economically disparate ways in which humans have affected the planet’s functioning will be mirrored in solutions, with a small, privileged group of engineers making decisions with global consequences (Nixon, 2014). These “ecotechnologies” represent a

rupturing in the relationship between humans and nature, and subsequently produce a space in which newer, better “natures” can be produced (Gough & Gough, 2016).

On the other hand, Ecomodernists argue that technological innovation is the only feasible means of reducing global climate emissions. They believe that innovation will ultimately make clean energy sources cheaper, breaking up the political gridlock often associated with climate negotiations. “Decoupling” is the term for technological innovations that intensify land use and reduce the human ecological footprint (Ausubel, 1996; Blomqvist, Nordhaus, & Shellenberger, 2012). Technology is praised for providing substitutes for primary commodities. According to its proponents, decoupling will be fueled by clean, cheap energy that enables humans to “rewild” previously degraded natural areas and restore their ecological functioning (Donlan et al., 2006). Geo-engineering, or altering the earth’s atmosphere through technology, is entertained as a viable solution to ameliorating the impacts of global climate change. But scale matters. The dominant environmental narrative endorses renewable technologies, albeit on a small scale, because they will spark “a fundamental shift in power relations between humans and the natural world” (Klein, 2015). Conversely, Ecomodernists endorse large-scale interventions including nuclear energy, geo-engineering, and de-extinction as a means of quickly achieving carbon emissions reductions.

View of Societal Response

This dimension is more idiosyncratic, encompassing the social roots of environmental problems as well as how they might be solved (government vs. individual action). It also includes issues of global inequity focused on the disparate impact of environmental problems, and variations in benefits of certain environmental solutions.

The dominant environmental narrative suggests that environmental degradation can be attributed to market failure, individual self-interest, and the structure of capitalism itself. This narrative blames capitalism and associated levels of industrialization, seeing corporations as manufacturing false needs through advertising and subsequently over-extracting from the biophysical environment (Klein, 2015; Hamilton, Scorchner, 2007; McKibben & McKibben, 2011). In this view, GDP is a false measure of progress and should

be replaced by quality of life concerns to recalibrate the human desire to live within the planet's carrying capacity and "natural limits". In contrast, Ecomodernists see natural limits and planetary boundaries as inherently malleable. Their underlying moral framework is that "everyone eats" (Robbins, 2012) and that a "politics of limits" is the privilege of countries already reaping the benefits of industrialization (Nordhaus & Shellenberger, 2007). "Institutional environmentalists" like Thomas Friedman and Al Gore believe that capitalism is capable of addressing environmental problems, but only if the correct policies are adopted (Friedman & Mandelbaum, 2011; Gore, 2006). Development itself is not problematic as long as it is "sustainable". Associated with this inherent faith in market institutions is the green consumerism movement, which sees purchasing power as a democratic means through which consumers can "vote" in the marketplace. Green libertarians, on the other hand, perceive the top-down organization of society itself as the root of the problem, advocating individual freedom, self-organization and broad guidelines instead of political or economic decrees from above (i.e., Bookchin, 1992; Hawken, Lovins, & Lovins, 2013).

The relationship between the developed and developing world and the associated economic and political imbalances have also been blamed for environmental problems. Conservation has long been understood as a priority only when material needs have been satisfied (Martinez-Alier, 2003). Some argue that strict environmental legislation in developed countries simply outsources the negative impacts to countries whose governments are less willing and/or able to prioritize environmental concerns (Lemos & Agrawal, 2006). This has led, in part, to the emergence of the environmental justice movement that recognizes that it is the global poor, and especially women, that bear the disproportionate burden of environmental degradation (Agyeman, 2003). Environmental concerns in the developing world tend to be strongly tied to quality of life concerns.

There is also substantive ideological diversity as to how social change might emerge. The dominant pro-environmental narrative advocates for small scale grassroots organization reminiscent of environmentalism heyday in the 1970's, as well as decentralized power sources like solar and wind. Other groups (i.e. Green Libertarians and "ecotopians") are even more critical of the ability of centralized institutions to engender change, and view global finance and politics as barriers to a truly sustainable lifestyle.

Social change, in their view, emerges from the cooperation of independent groups of people engaged in self-sufficiency, working towards microcosms of a sustainable society. Institutional environmentalists (Nisbet's Smart Growth reformers, green consumers, environmental economists) see change as possible with corrections to the market, such as accurately pricing carbon. Others (bright green environmentalists, Ecomodernists) see the market as helpful but insufficient in its ability to address environmental problems. Citing the rapacious demand for energy coming from the developing world, they find solar and wind power insufficiently scalable to serve as primary energy sources (Pielke, 2010). From this viewpoint, social change will be the outcome of technological innovation, as making green energy cheap will enable international political negotiations to succeed.

Conclusion

Nearly forty years ago, Dunlap et al. did the social sciences an immense service by defining and measuring a particular type of environmentalism. Since, the NEP has captured the dominant pro-environmental worldview, was confirmed by numerous related studies, and thus continues to be widely used. But environmentalism has never been coherent, and is certainly not coherent today. Many environmentalists, when they encounter the NEP question items, undoubtedly feel conflicted choosing their responses. Rather, they believe human ingenuity can restore degraded environments, think technology is our best hope for addressing climate change, have faith that global negotiations could avoid a major ecological catastrophe. It is likely many of them would not score highly. And subsequently a percentage of the population with strong pro-environmental attitudes and values would be categorized as anti-environmental by the most widely used measure of environmental worldviews. This is enough of a problem to warrant at least a re-examination, if not major reconsideration, of the New Environmental Paradigm scale.

Quantifying and operationalizing any social construct involves simplification. In recognizing the NEP's social, historical, and political context, it is tempting to reject outright the type of simplistic question items used by survey research to quantify any abstract theoretical concept in the general population. But to do

so would ignore the contribution the NEP has made to environmental sociology, and the ability of similar scales to continue this legacy.

CHAPTER 3

PAPER 2: ASSESSING THE DIVERSITY OF CONTEMPORARY ENVIRONMENTALISM: TIME FOR A NEW PARADIGM

Introduction

The New Environmental Paradigm Scale (Dunlap & Van Liere, 1978) operationalizes a pro-environmental narrative that suggests environmentalists share similar worldviews. While the ideological foundations of the NEP have been critiqued (e.g., Lalonde & Jackson, 2002; Kopnina, 2011; Lundmark, 2007) no investigation has explored the differences underlying contemporary environmental worldviews from a heterogeneous set of perspectives. This research has three elements. First, the diversity of worldviews of a carefully chosen group of environmentalists was explored to summarize their thoughts on environmental problems and solutions. Second, the basis for this diversity was investigated with respect to how it presents itself in terms of environmental problems, in particular the characteristics respondents assigned to different solutions. Finally, age and generational differences were studied, given that they are often used to explain the diversity of contemporary environmental worldviews (e.g., Kloor, 2012).

Methods

Past attempts to develop typologies have been problematic, in part, because they have either been thought exercises or reliant on premature conclusions that were then generalized to the national population. To avoid these pitfalls, the objective of this exploratory study was to focus on a small, carefully chosen sample. While the findings may be *suggestive* of the worldviews of the general population, the present goal is to generate hypotheses to inform further research. Formal hypothesis testing would be presumptive and potentially lead to a reductive metric.

Participant Selection

Potential participants were identified using non-probability sampling, as well as purposive and maximum variation techniques. The sample was restricted to U.S. residents aged 18 or older and the

recruitment method was multi-modal with an announcement distributed to a diverse array of environmental groups and individuals. Amazon's Mechanical Turk was used to recruit demographic groups who did not respond to the initial recruitment effort, namely non-Caucasians, members of older age brackets, and respondents with less than a high-school education. The researcher selected participants for in-depth interviews on a case-by-case basis based on the strength of their pro-environmental worldviews and the degree to which they harbored different environmental worldviews from other participants. This was done using a pre-screener questionnaire, which had two parts (see Appendix B). Part 1 assessed participants' pro-environmental worldviews, based on the degree to which they prioritized environmental issues over other social issues, whether they valued the environment over the economy, and whether they identified with the term "environmentalist". These items were added together to create an index, and applicants scoring in the top quartile of the index were considered to fit the definition of having a strong pro-environmental identity. Part 2 included question items pertaining to attitudes towards technology, nature, society, and scale. Some question items were modeled after items in the NEP scale, while others were developed by the researcher using standard question development techniques (i.e., Dillman, Smythe, & Christian, 2014). Demographic diversity was taken into account but did not override attitudinal variables in the selection process. Participants were offered a description of the study and signed a consent form. Both in-person and video-conferenced interviews were conducted, and participants were offered compensation although eight participants did not accept.

Repertory Grid Interviewing Technique

Given the exploratory nature of the study, repertory grid interviews were determined to be an appropriate data collection technique. The Repertory Grid approach, derived from Personal Construct Theory (Kelly, 1955), does not pre-emptively ascribe individuals with a particular set of attributes, but instead focuses on the processes by which people structure and comprehend their world. Of particular importance to this project is that the Repertory Grid interview method does not place the researcher in a superior position

to the individuals being studied (Neimeyer & Bridges, 2003). The role of the researcher is minimized when compared to other data collection techniques (Whyte & Bytheway, 1996).

There are four features of a repertory grid: a topic, elements, constructs, and ratings. Climate change was used as the topic rather than asking participants to discuss environmental issues generally. The topic of climate change was narrow enough to enable focused responses, yet broad enough to encompass a wide variety of ideological viewpoints. The topic was qualified by stating, "...in terms of what people might think are effective solutions" to reduce social desirability bias and standardize how participants conceived of the subject. For remote interviews, the grids were entered into a database using the software GridSuite. For in-person interviews, the grid was recorded using a paper template (see Appendix C) and later uploaded. Each repertory grid interview takes between 45 and 90 minutes depending on the participant.

Elements show what participants think about a topic, which in this study were the solutions to climate change. These were hand-written across the top of the page (face-to-face interviews) or entered into the "Triad Elicitation" option in GridSuite and shown to the respondent using the shared-screen capacity (video-conferenced interviews). Constructs indicate how participants think about the topic. Following Jankowicz (2005), participants generated constructs using the triadic method wherein three elements were selected and the participant was asked how two were the same and yet different from the third. This process was repeated until the participant could not generate more constructs without repeating him or herself. Participants then rated the elements on a 1-5 point Likert-type scale questionnaire using the constructs. The rating process was repeated until all elements were rated.

Analysis

Sample Description

A total of 283 respondents completed the pre-screener, from which 22 participants were ultimately interviewed using the Repertory Grid method. Twelve participants were male and 10 were female. Age ranged from 19-24 to 65+, though the majority of participants were between 25 and 44 (73%). Five participants did not hold a college degree (23%), while half held a postgraduate degree. Participants identified as Caucasian

(68%), Hispanic/Latino (14%), African American (9%), Asian (5%), and biracial (5%). All 22 participants indicated that the environment was one of the most important social issues facing society, 86% saw protection of the environment as more important than economic growth, and 73% identified as an environmentalist.

Individual grids were aggregated after being inputted into GridSuite, and basic descriptive statistics were run on the pre-screener items using the statistical program SPSS. Content analysis was conducted on the constructs and elements individually. The 183 elements and 135 constructs pairs (270 construct poles) suggested by participants were sufficient to provide a baseline by which to draw initial suggestions (Lombard, Snyder-Duch, & Bracken, 2002). A data driven (as compared to theory driven) approach was chosen to avoid researcher bias in category development, plus pre-existing sets of codes were not applicable to the data set (see Green, 2004). Descriptive coding, which summarizes the content, was used to capture the multitude of ways solutions were described by participants (Saldana, 2009). The bootstrapping technique described by Jankowicz (2005) was employed to generate the initial content analysis categories. The primary researcher and a secondary coder unfamiliar with the objective of the study each coded the data independently. For the constructs, each pole was treated as an individual data unit, and each coder assigned codes independently before discussing and subsequently refining the codes. Each independent coder conducted a second round of coding using the refined codes.

Results

Pre-Screener Survey

Most participants believed that national laws and policies (Q3, $M = 3.64$, $SD = .581$) and international agreements (Q2, $M = 3.18$, $SD = .733$) were the most important ways to address environmental problems. Participants had the least amount of faith in individual, lifestyle-based behaviors (Q1, $M = 2.82$) and disagreed about their effectiveness ($SD = .795$) (see Table 3.1).

Table 3.1*How important are each of the following in solving environmental problems?*

	Not important at all (1)	Not that important (2)	Important (3)	One of the most important (4)	<i>M</i>	<i>SD</i>
Q1. People making small changes in their daily lives	9%	14%	64%	14%	2.82	.795
Q2. International agreements	0%	18%	46%	36%	3.18	.733
Q3. National laws and policies	0%	5%	27%	68%	3.64	.581
Q4. People working together in small groups	0%	18%	68%	14%	2.95	.575

n=22

Further responses show that participants largely agreed that an ecological catastrophe is inevitable in the absence of major change (Q13, $M = 3.55$, $SD = .739$) and that there are hard planetary boundaries (Q12, $M = 3.50$, $SD = .740$). A majority of participants indicated that the planet's upper limits were close to being reached, but a high level of disagreement existed within the sample (Q6, $M = 2.91$, $SD = 1.01$). While technology was largely perceived as causing more problems than it solves (Q8, $M = 2.59$, $SD = .959$) it was also seen as a solution (Q10, $M = 2.45$, $SD = .912$). Participants were mixed about the normative aspects of human-environment interactions, and the item "nature would be at harmony if human beings would leave it alone" generated the most disagreement (Q5, $M = 2.73$, $SD = 1.03$). Participants were skeptical about the effectiveness of green consumerism (Q7, $M = 2.45$, $SD = .963$) (see Table 3.2).

Table 3.2*Please indicate your level of agreement with the following statements*

	Strongly disagree (1)	Somewhat disagree (2)	Somewhat agree (3)	Strongly agree (4)	<i>M</i>	<i>SD</i>
Q5. Nature would be at harmony if human beings would leave it alone	14%	27%	32%	27%	2.73	1.03
Q6. We are approaching the maximum number of people the earth can support	14%	14%	41%	32%	2.91	1.01
Q7. Shopping decisions made by individuals can solve environmental problems	18%	32%	36%	14%	2.45	.963
Q8. Technology causes more environmental problems than it solves	18%	18%	50%	13%	2.59	.959
Q9. Almost everything we do in modern life is harmful to nature	14%	18%	50%	18%	2.75	.935
Q10. Environmental problems will eventually be solved through better technology	14%	41%	32%	14%	2.45	.912
Q11. The balance of nature is fragile and easily upset	0%	41%	36%	23%	2.82	.795
Q12. The earth has limited room and resources	0%	14%	23%	64%	3.50	.740

Q13. We will experience a major ecological catastrophe if society continues on its present course	0%	14%	18%	68%	3.55	.739
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n=22

Elements

Study participants generated a total of 183 elements ($n = 22$, $M = 8.4$, $SD = 1.4$) and Cohen's κ was run to determine if there was agreement between the two coders based on the criteria established by Landis & Koch (1977). There was moderate agreement (interrater agreement = 86%, $\kappa = 0.068$, $p < 0.000$) after the initial round of coding. The coders discussed the categories where there was the most disagreement and revised accordingly. A second round of blind independent coding showed strong agreement (interrater agreement = 99.5%, $\kappa = 0.994$, $p < 0.000$).

The final code assignments and frequencies are shown in Table 3.3. Green technology as a component of addressing climate change comprised 22% of the sample. This was followed by reducing resource consumption (15%) and policies and regulations (15%). The role of emissions caused by gasoline-fueled, car-based transportation was widely recognized by participants (10%). Attitudinal or behavioral change (for example education and awareness) was mentioned by 9% of participants and apolitical lifestyle behaviors by 7%. The role of individuals in enacting policies was relatively small (6%) when compared to other solutions, despite many participants mentioning the importance of policies and regulations. Recycling was mentioned with regularity (5%). Relatively few participants mentioned preservation (4%), community-based actions and shared services (4%), and adaptation and planning ahead (2%).

Table 3.3

Element Content Analysis: Definitions and Frequencies

Category	Definition	Examples	Freq.	%
Green Technology	Technological developments that enable lower emissions	Wind and solar, geoengineering, nuclear reactors, grid-scale batteries	40	22
Reduce resource consumption	Reducing carbon emissions through behaviors and practices	Conserve water, less fishing reduction of fossil fuels, buy less stuff	28	15
Policies/Regulations	Policies enacted by government to lower carbon emissions; Improved functioning of government; Regulation of business	Cap and trade, carbon tax, get money out of politics	27	15
Reduce traditional car dependence	Reduce fossil fuel-based transportation and move to alternative forms of transportation	Electric cars, alternative transportation, alternative transportation, drive less	18	10
Education/Awareness	Educating individuals; Motivating behavioral and attitudinal changes	Education and awareness, empowering individuals, more faith in science	17	9
Individual lifestyle behavior- apolitical	Behaviors taken by the individual not directly related to politics	Consumer choices, lifestyle changes	13	7
Individual lifestyle behavior- political	Explicitly political behaviors engaged in by the individual	Political protest, call congresspeople, political advocacy	11	6
Recycling	Reuse and recycling of materials already in commodity chain	Recycling, reuse plastic, upcycling	9	5
Preservation	Returning ecosystems to their “natural” state; Preserving functional ecosystems; Removing barriers to ecosystem functioning	Conservation of natural lands, reforestation, dam removal	8	4
Community-based action/Shared services	Implementing solutions at the local level; Localization of production; Sharing services and resources	Community solidarity, local food production, relocalization	8	4
Adaptation/Planning ahead	Implementing plans to avoid impacts of climate change; Adapting to impacts of changed climate	Climate adaptation measures, intentional community planning	4	2
Total			183	100

Constructs

A total of 135 constructs were generated by participants ($n = 22$, $M = 8.22$, $SD = 1.41$) which resulted in 270 construct poles. Content analysis showed strong levels of intercoder reliability after two rounds of independent coding. Agreement was moderate to weak (interrater agreement = 72%, $\kappa = 0.198$, $p < 0.000$) before the first discussion between independent coders, but extremely strong (interrater agreement = 96%, $\kappa = 0.602$, $p < 0.000$) after discussion of the categories and blind independent recoding.

The final code assignments and frequencies are shown in Table 3.4. Fifteen codes were assigned to 270 construct poles (not including “Miscellaneous”). The most frequently mentioned construct pole was economic concerns (13%). Social change was also mentioned regularly (13%), in particular how individuals and small groups exert agency to actualize certain types of solutions. Approximately 9% of the sample brought up the degree of difficulty associated with certain solutions (including how the public would respond) and the temporal dimension of solutions (such as whether one solution would lead to further problem solving and the balance between short and long term goals). Technology was regularly mentioned (9%), particularly within the context of intensiveness. Less frequently mentioned (7% each) was degree of upheaval (how much solutions would disrupt the status quo), broadness of impact (whether the solution addresses a single or multiple issues), and individual attitudes, values, and behaviors. Scale and place (physical space, such as local vs. global scale) and structural change (the over-arching social structures that constrain individual decision-making) were mentioned by 5% of participants, while land-use issues and politics/public sector was mentioned by 4% of the sample. Categories mentioned relatively infrequently (2% or less) focused on whether the objective of the solution was ecocentric or anthropocentric, whether the solution was ultimately effective, and the solution’s normative importance. Miscellaneous items constituted 3% of the sample which is below the recommended 5% limit (Jankowicz, 2005).

Table 3.4

Construct Content Analysis: Definitions and Frequencies

Category	Definition	Examples	Freq.	%
Economics	Economic issues, effect on GDP, role of the consumer, commodity chains	Business; consumer demand; costly; developed world problem; expensive; extractive; private sector; indifferent to effect on GDP; smart consumption	36	13
Social Change	How people exert their agency and engage with groups to enact change	Social; community focused; collaboration required; individual; needs many people to be effective; collective	34	13
Degree of difficulty	How difficult the solution would be to actually make happen, including whether the general public would be willing and engaged	Actionable; difficult; exciting; harder to achieve; practical; controversial; public skepticism; very challenging	25	9
Time	When change happens, temporal nature of solutions	Gradual change; immediate change; leads to other solutions; less environmental impact in short term; incremental change; long term solution	25	9
Technology	Technological intensiveness of solutions (high vs. low)	High technology; low technology; technology independent	23	9
Degree of upheaval	Degree to which solution is consistent with the status quo versus disruptive, and how accepting public will be of solution	Agreed on; disruptive change; proactive; reactive; innovative; familiar; novel	20	7
Broadness of impact	Whether the solution is single issue specific or general and multi-issue. Also includes the scope of the solution's impact.	Addresses single problem; addresses multiple problems; distributed; specific; stand alone; focused impact	19	7
Individual attitudes, values, behaviors	The role of individual decisions, worldviews, and interpersonal behaviors	Requires behavioral change; education; behavioral	15	6
Scale and place	Scale of change- local, global, micro, macro	Global; Large scale; Macro scale; network; place specific; small scale	14	5
Structural change	Over-arching structures that enable certain types of change over others	Centralized; decentralized; external; structural; top down; internal	13	5
Land use issues	Land-use decisions and their impacts.	Agricultural; food production; preservation; rural; urban; uses less space; small footprint	12	4
Politics and public sector	Associated with government and the public sector	Government; Policy; Public; Political	10	4
Misc.	Anything that doesn't fit into other categories	Abstract; requires home ownership; point	8	3
Ecocentrism and anthropocentrism	Focus of solutions, on whether they benefit people or on other species	Benefits all species; benefits humans; humanity focused goal; impacts people's health	6	2

Degree of effectiveness	Degree to which solution would be effective	Ineffective; Larger impact on carbon reduction; changing things for the better	5	2
Importance	Level of urgency and overall importance when compared with other solutions	Necessary; optional; must act because directly affected; don't act because not directly affected	5	2
Total			270	100

Differential Analysis

Elements

Differential analysis by age (Table 3.5) was conducted on the content analysis of the elements using the procedure described by Jankowicz (2005). In the analysis, group size was normalized to prevent larger age groups from being over-represented. Overall, the youngest age groups (19-34) were more likely to suggest green technology as a solution to climate change than the older age groups (55+). Older participants (55+) focused on solutions at the individual level, such as education and awareness, along with political and apolitical lifestyle behaviors. Reducing resource consumption was mentioned most by middle-aged participants (35-54), while the younger age groups (19-34) mentioned it occasionally. Older age groups (55+) rarely mentioned resource consumption. Young and middle-aged participants (19-44) were more likely to bring up reducing traditional car dependence and preservation, while policies and regulations were discussed most frequently by members of the middle-to-older age range brackets (25-54).

Table 3.5

Element Content Analysis: Differential Analysis by Age

Category	19-24	25-34	35-44	45-54	55-64	65+
<i>n</i> =	2	9	7	1	1	2
Adaptation/Planning Ahead	7%	3%	2%	0%	0%	0%
Community-based action/Shared services	7%	3%	9%	0%	0%	0%
Preservation	14%	3%	6%	0%	0%	5%
Education/Awareness	7%	4%	4%	0%	78%	21%
Green Technology	36%	30%	13%	25%	0%	5%
Individual lifestyle behavior (apolitical)	7%	9%	4%	0%	22%	5%
Individual lifestyle behavior (political)	0%	4%	0%	0%	0%	42%
Policies/Regulation	0%	16%	19%	25%	0%	16%
Recycle	0%	6%	4%	25%	0%	0%
Reduce resource consumption	14%	12%	26%	25%	0%	5%
Reduce traditional car dependence	7%	12%	15%	0%	0%	0%

To examine whether there were statistically significant relationships between age brackets and elements, the age and element variables were recoded into binaries and a Fisher's Exact test with Goodman

and Kruskal's gamma was run. This was used in lieu of a chi-square test of independence due to the small sample size. While no statistically significant relationships were found, there was a notable negative relationship between age and technology ($p = .090$, $\gamma = -1.00$).

Constructs

Differential analysis was conducted on the constructs using the same procedure as the elements (Table 3.6). The differentiations by age with respect to the constructs were less clear than with the elements. In general, young to middle aged participants (19-44) were more concerned with economic issues while middle-aged and older participants (45+) were more likely to mention the temporal dimension of change. All groups discussed social change, though young and middle-aged participants (25-44) mentioned the structures constraining social change more frequently than older participants. Older participants (55+) placed more importance on individual attitudes, values, and behaviors. Young and middle-aged participants (44 and below) were the only groups to discuss land use issues and no respondent aged 55+ mentioned technology.

Table 3.6
Construct Content Analysis: Differential Analysis by Age

Category	19-24	25-34	35-44	45-54	55-64	65+
<i>n=</i>	2	9	7	1	1	2
Economics, Private sector, Production, Consumption	15%	13%	18%	0%	0%	0%
Social change	12%	8%	16%	17%	30%	14%
Time	12%	7%	2%	33%	0%	36%
Degree of difficulty	12%	7%	10%	17%	0%	14%
Technology	8%	12%	8%	8%	0%	0%
Degree of upheaval	8%	8%	8%	0%	20%	0%
Broadness of impact	12%	6%	7%	0%	0%	14%
Individual attitudes, values, behaviors	4%	4%	2%	0%	50%	9%
Scale and place	0%	8%	6%	0%	0%	0%
Structure of change	0%	9%	3%	0%	0%	0%
Land use issues	8%	4%	7%	0%	0%	0%
Political and public sector	4%	3%	5%	0%	0%	0%
Ecocentrism and anthropocentrism	8%	3%	0%	8%	0%	0%
Importance	0%	3%	0%	17%	0%	0%
Degree of effectiveness	0%	3%	2%	0%	0%	0%

A Fisher's Exact test with Goodman and Kruskal's gamma was run using the same procedure as with the elements. While not statistically significant, technology again emerged as negatively related to age ($p = .080$, $\gamma = -.775$).

Discussion

The first objective of this research was to explore the diversity of worldviews of a carefully chosen set of environmentalists as a response to the unidimensionality of the New Environmental Paradigm scale. Most fundamentally, this exercise demonstrated the need for a much broader understanding of contemporary pro-environmental thought. The NEP is based on the idea that environmentalists will respond to a set of question items in similar ways. It is assumed that environmentalists reject human exceptionalism, believe nature has an inherent balance that human activity disturbs, recognize fundamental planetary boundaries, believe human and non-human life have equal status, and foresee an impending ecological crisis. This study suggests that the beliefs of environmentalists *are* consistent with some aspects of the NEP, particularly in areas related to planetary boundaries and belief in the potential for an ecological catastrophe. But participants diverged significantly from the NEP in other areas, such as whether humans disrupt the inherent balance of nature, whether individual behavior is an effective tool for making environmental change, and whether overpopulation poses a substantive environmental threat. Notably different from the NEP's characterization of environmentalists was how participants perceived technology, which even skeptics recognized as playing a critical role in addressing climate change. Participants in this study (many of whom who work for environmental organizations, volunteer for environmental causes, and vote on the basis of environmental issues) would be described as possessing weak pro-environmental worldviews if evaluated using the NEP. A serious exploration of what might comprise an alternative scale is imperative.

The second objective of this research was to investigate the underlying basis for the heterogeneity of the sample's environmental worldviews. The volume and diversity of solutions, and how participants differentiated between them, suggests that this group of environmentalists did not share a single over-arching strategy for achieving climate progress. Many differentiated solutions on the basis of scale and agency, recognizing that that what individuals and small groups *could* do was less effective, while large scale solutions that could make measurable progress seemed out of reach. Thus, problem solving was envisioned as occurring through multiple pathways and at a variety of scales. Perhaps the complexity of climate change,

combined with the multi-scalar options for addressing it, helps explain contemporary environmentalism's fragmentation when compared with the single-issue campaigns of the 1970's.

Many of the preliminary findings reflected broader trends within contemporary environmental thought as shown in popular opinion polls. Technology was a source of conflict for many participants. Despite many participants attributing environmental problems to the irresponsible use of technology, green technologies were nearly universally suggested as an integral component of addressing global climate change. The latter is consistent with national polls that show strong levels of bipartisan support for alternative energy (Swift, 2014), but the former may explain some of the conflict between environmental groups regarding the scale (industrial vs. residential) and type (solar/wind vs. natural gas and nuclear) regarding how these technologies should be deployed. Second, it appears that the well-worn trope of economy vs. environment remains top-of-mind for many. Participants were quick to recognize the economic investment necessary to actualize certain solutions, and others seemed resigned that pragmatic solutions would be unlikely to fundamentally disrupt the global economy. Third, despite record levels of skepticism towards government (Elving, 2015; Pew Research Center, 2014), participants acknowledged that political solutions were an integral part of environmental problem solving. In particular, many saw the national scale as a powerful potential platform for action, reflecting the way in which environmental legislation- should it be enacted- is a core aspect of environmentalism's historical legacy as well as the contemporary narrative. Overall, the convergence between these findings and national opinion polls suggests that other aspects of this exploratory study should be investigated more systematically within the national population.

The third objective of this project was to explore whether and how environmental worldviews varied by age. The differences between age groups elucidated themes that dovetailed with recognized social trends. For example, "boomer environmentalism" has long been characterized by a dual focus on the individual (i.e. the "me generation") as well as faith in collective action to solve social problems. In this study, the oldest cohorts highlighted the importance of the individual and the political, particularly the way in which individuals can affect the political system. For those active in environmental politics during the late 1960's and early 1970's, this is likely consistent with their lived experience during which grassroots organizing

enabled the widespread adoption of national environmental policies. While young people believed that acting at the national scale was important, they did so at much lower levels than the rest of the sample. Younger participants rarely suggested political engagement or solving problems through policy, reflecting young Americans' widely documented lack of faith in governmental institutions (Pew Research Center, 2014). Thus, while they believe that national laws and policies are important, they have little faith in the ability of institutional structures to bring about effective legislation. Rather, despite reluctance on the part of some, younger participants overwhelmingly mentioned technological solutions coupled with reducing resource consumption. *Only* participants younger than 44 mentioned alternative transportation, suggesting that a move away from single-occupancy vehicles by young people may dovetail with their approach to environmental problem solving (Beck, 2016). Based on this sample, it appears that age is a variable that warrants further investigation.

One surprising outcome was that very few participants mentioned what might be the epitome of the dominant environmental narrative: preservation, conservation, and the protection of wilderness. This runs counter to the accusations of the social deconstructionists of the mid-1990's who claimed that environmentalists were overly attached to an idealized, Edenic, non-human nature (i.e. Cronon, 1995). There are two ways to interpret this absence. On one hand, this may reflect a widespread acceptance of the so-called Anthropocene, wherein humans are the primary planetary actors (see Steffen, Crutzen, & McNeill, 2007) though this does not settle the debate as to whether the Anthropocene is "good" (see Revkin, 2014) or "bad" (see Altvater et al., 2016). On the other hand, the absence of wilderness in this study could be context-dependent. While climate change is an umbrella under which many other issues are subsumed, it may simply be that there are more effective means of addressing climate change than wilderness protection. Perhaps non-human nature and/or wilderness protection would have emerged had the topic been biodiversity loss. Or feasibly these repertory grid interviews were simply not germane towards capturing belief in the purity of wilderness because the topic was posed as a problem-solving exercise rather than a question of epistemology. More research is needed.

Conclusion

Riley Dunlap designed the survey that was to become the New Environmental Paradigm Scale in a markedly different political and social landscape. The environmental movement was fresh off a string of legal victories in the early 1970s, including the Clean Air Act, the National Environmental Policy Act, and the Endangered Species Act. As time went on, environmental interest groups became increasingly professionalized and affiliation with environmentalism spread. Approximately 76% of Americans identified as an environmentalist by 1989 (Jones, 2016) and Bill McKibben would argue in the same year that there was, in fact, no nature left to preserve. According to McKibben, climate change had made all ecosystems essentially human-engineered, intentional or not (McKibben, 1989). Nonetheless, it seemed as if humans practiced restraint and humility, they could usher in a New Ecological Paradigm.

Twenty-five years later, affiliation with the term “environmentalist” was down to 42% and climate has become an increasingly partisan issue. Today, dramatically more Democrats identify as “environmentalist” than do Republicans (Jones, 2016). This is not a question of terminology, but rather, how attitudes towards climate science have become a proxy for identity (Kahan, 2014). It is apparent that the environmentalism of the 1970’s was quite different, both in terms of context and ideology, than the environmentalism of today (even down to the rejection of the term itself). The tool being used to measure today’s environmentalism does not appear to capture these differences, which were shown in this project to include a growing acceptance of technological solutions and the recognition that a hands-off approach to environmental problem solving is unrealistic. The development of a new scale is no abstract academic exercise, as the environmental worldviews of the general public inform what is considered socially, economically, and politically possible. A scale that accommodates the emergent changes within pro-environmental thought has, therefore, the potential to help create and sustain a more livable planet.

CHAPTER 4

PAPER 3: CONTEMPORARY ENVIRONMENTAL TYPOLOGIES: THE CASE FOR A RENEWED ENVIRONMENTAL PARADIGM SCALE

Introduction

There have been many multi-item scales developed to quantify American environmentalism, but the most widely used is Dunlap and Van Liere's New Environmental Paradigm Scale (NEP) (Dunlap & Van Liere, 1978). The foundations of the NEP have, however, been called into question despite its pervasive use. For one, the scale presumes that environmentalism has internal ideological coherence, which has never truly been the case (Gottlieb, 1993). Other critics have demonstrated that environmental problems, and the way the general public makes sense of these problems, has become increasingly complex since the NEP's development (Lalonde & Jackson, 2002). Alternative taxonomies have attempted to better illustrate the diversity of environmentalism, but these endeavors have also proven problematic. No typology will ever permanently capture environmentalism's ideological diversity, which is inherently situated within a broader cultural, environmental, economic, and political context. Rather than engage in a pure thought exercise or seek empirical validation before theoretical foundations are established, this project employs qualitative and quantitative methods to uncover a suggestive typology that could provide the basis for further study. Given that environmental worldviews influence what is achievable, politically and otherwise, this work is both timely and necessary given the environmental challenges facing humanity.

Methods

The overall approach was designed to group participants based on shared characteristics, and provide a substantive, in-depth look into the mental models of the participants who best exemplified their cluster (for methodological background see Jain, 2010; Steinley, 2006; Anable, 2005; Dietz, Kalof, & Stern, 2002; Green, 2004; Ackerberg & Prapasawudi, 2009; Embacher & Buttle, 1989; Pike, 2003; Fransella, Bell, & Bannister, 2004). The sample sought for this study was individuals with strong pro-environmental identities who were ideologically different from each other with respect to their environmental worldviews. The sample was

restricted to U.S. residents aged 18 or older with potential participants identified using purposive and maximum variation sampling techniques (e.g., Dudovskiy, 2016; Black, 2009; Crossman, 2016; Cohen & Crabtree, 2006). The recruitment method was multi-modal. An announcement was first distributed to a diverse array of environmental groups and individuals, and Amazon's Mechanical Turk was used to recruit under-represented demographic groups, namely non-Caucasians, older age brackets, and respondents with less than a high-school education. The researchers selected participants for in-depth interviews on a case-by-case basis based on the strength of their environmental attitudes and values, and the degree to which they harbored environmental worldviews different from other participants. This was achieved using a two-part pre-screener questionnaire (Appendix B). Part I assessed pro-environmental attitudes and values based on the degree to which participants prioritized environmental issues over other social issues, whether they valued the environment over the economy, and whether they identified with the term "environmentalist". These items were added together to create an index, and applicants scoring in the top quartile of the index were considered to fit the definition of having a strong pro-environmental identity. Part II of the pre-screener included question items pertaining to attitudes towards technology, nature, society, and scale. A number of these questions were modeled after items in the NEP, while others were developed by the researchers using standard question development techniques (see Dillman, Smythe, & Christian, 2014): simple terminology was employed, double-barreled question items were avoided, and questions were ordered to avoid priming. Specifically, general questions were asked first, while items having to do with environmental attitudes and values followed. Demographics were asked last. Demographic diversity was taken into account but did not override attitudinal variables in the participant selection process. Given that the sample was modeled after a focus group rather than the U.S. population, strict adherence to demographic proportions would have limited the study.

Given the exploratory nature of the study, the repertory grid technique based on Kelly's (1955) Personal Construct Theory was employed since it does not prematurely ascribe individuals with a particular set of attributes. A total of 22 repertory grid interviews (conducted in-person or via videoconferencing) were conducted during the summer of 2016, each of which lasted between 45 and 90 minutes. The technique

focuses on understanding how people structure and comprehend their world, and the role of the researcher is minimized when compared to other data collection techniques (Whyte & Bytheway, 1996). The four features of a repertory grid include a topic, elements, constructs, and ratings. The topic of climate change was selected since it is narrow enough to focus responses (as compared to a broader matter such as environmental issues) yet still encompasses a wide variety of perspectives and ideological viewpoints. The topic was qualified by asking participants what people might think are effective solutions to climate change in order to reduce social desirability bias and standardize how participants understood the topic. Elements (solutions to climate change, in this case) were then elicited from participants to show how they characterized the topic. These elements were written in a hardcopy grid (see Appendix C for a Repertory Grid Template) or entered into the “triad elicitation” option of the GridSuite program. Constructs represent a finite set of dichotomous views that structure a participant’s worldview and are used to both make sense of a topic and to differentiate elements (Jankowicz, 2005). Participants were encouraged to suggest between six and ten constructs per element using the triadic approach, where three elements were selected (or selected randomly by GridSuite) and participants were asked how two elements are similar and yet different from the third. This process was repeated until the respondent could not generate any new constructs. Finally, elements and constructs were linked using a 5-point Likert-type scale questionnaire where each element was rated based on how it relates to the dichotomous poles of each construct.

Individual grids were aggregated after being inputted to GridSuite and content analysis was conducted on the constructs and elements individually per the recommendation of Jankowicz (2016). Repertory grids are typically analyzed quantitatively, however “content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use” (Krippendorff, 2004). The 183 elements and 135 constructs pairs (270 construct poles) suggested by participants were sufficient to provide a baseline by which to draw initial suggestions (Lombard, Snyder-Duch, & Bracken, 2002). Pre-existing sets of codes were not applicable to the data set (see Green, 2004). Descriptive coding, which summarizes content, was used to capture the multitude of solutions to the topic (Saldana, 2009). A data driven (as compared to theory driven) approach was selected to avoid researcher bias

in category development. The bootstrapping technique was employed to generate the initial content analysis categories, wherein the constructs were examined systematically for the themes they represented (for more on bootstrapping, see Jankowicz, 2005). The primary researcher and a secondary coder (who was unfamiliar with the objective of the study) coded the data independently. For the constructs, each pole was treated as an individual data unit, and each coder assigned codes independently before discussing and subsequently refining the codes. Each independent coder conducted an additional round of coding using the refined codes.

Analysis

Analysis was conducted in three stages. The first stage provided the broadest, most general assessment of the sample, while subsequent stages were progressively more detailed. Cluster analysis was initially performed on pre-screener items to identify groups and determine group membership. Content analysis was then conducted on the repertory grids and differential analysis was subsequently conducted by cluster. Finally, the repertory grid interview of the respondent closest to the center of each cluster was analyzed using cluster and principal component analysis. This interview is discussed in detail to provide the most depth in terms of describing the shared characteristics of each cluster.

Sample Description

A total of 283 respondents completed the pre-screener, from which 22 participants were ultimately interviewed using the Repertory Grid method. Twelve participants were male and 10 were female. Age ranged from 19-24 to 65+, though the majority of participants were between 25 and 44 (73%). Five participants did not have a college degree (23%), while half held a postgraduate degree. Participants identified as Caucasian (68%), Hispanic/Latino (14%), African American (9%), Asian (5%), and biracial (5%). All participants indicated that the environment was important when compared with other social issues (terrorism, immigration, healthcare), felt that either the environment was equally (14%) or more important than economic growth (86%), and 73% identified as an environmentalist.

Cluster Analysis of Pre-Screener Data

Cluster analysis is an exploratory analysis tool wherein data points are grouped using a number of input variables. The resulting groups are internally similar and yet different from the other groups (Kaufman & Rousseeuw, 2005). Kmeans clustering was selected for its flexibility. Input variables were reduced by eliminating items with low p-values (significance of .250 and above) and one-way ANOVA testing of the various cluster solutions using Tukey's and Bonferroni's post-hoc tests were used to further reduce the variable set. The final solution, which used four question items to cluster respondents ($p < .001$) was selected due to the low number of iterations needed for convergence (2) and the number of cases in each cluster (see Table 4.1). This reflects, in part, the hypothesis that nature, technology, and scale of society differentiate participants, with the addition of catastrophism.

Table 4.1

Four Cluster Solution One Way ANOVA of Question Items

Question Item	F	Sig.
How important are each of the following in solving environmental problems? People making small changes in their daily lives	17.27	.000
Almost everything we do in modern life is harmful to nature	9.12	.001
We will experience a major ecological catastrophe if society continues on its present course	26.91	.000
Technology causes more environmental problems than it solves	23.97	.000

Each of the four clusters was then assigned a group description label to represent its internal characteristics and connect it with broader ideologically coherent groups (see Appendix D for Crosstabulations of Pre-Screener Items by Cluster).

Sub-Group Descriptions

Pragmatic Reformers (n=5)

Pragmatic Reformers were young to middle age (80% > 44 y/o) primarily Caucasian (80%) individuals who take environmental problems seriously. This sub-group strongly believes “the earth has limited room and resources” ($M = 3.80$, $SD = .447$), “we are approaching the maximum number of people the earth can support” ($M = 3.80$, $SD = .477$), and that there will be a “major ecological catastrophe if society continues on its present course” ($M = 4$, $SD = 0$). The sub-group also has faith in multiple approaches to

environmental problem solving and does not endorse the idea that “technology causes more environmental problems than it solves” ($M = 1.60, SD = .548$). The sub-group trusts that “environmental problems will eventually be solved through better technology” ($M = 2.80, SD = .447$) and sees positive environmental change happening in multiple ways such as shopping decisions made by individuals ($M = 2.6, SD = .894$) and at multiple scales (individual, grassroots, global), though they feel most strongly about the power of national laws and policies ($M = 4, SD = 0$).

Activist Greens (n=9)

The Activists Greens skewed older (no members were under the age of 25, three members were 45+), relatively diverse (three members identified as non-Caucasian) and were the only sub-group with more female members than male. Sub-group members believe that “almost everything we do in modern life is harmful to nature” ($M = 3.44, SD = .527$) and that “nature would be at harmony if human beings would leave it alone” ($M = 3.33, SD = .866$). Like the Pragmatic Reformers, the Activist Greens sub-group believes that “the earth has limited room and resources” ($M = 3.89, SD = .333$) and that there will be a “major ecological catastrophe if society continues on its present course” ($M = 3.89, SD = 0.333$). Unlike the Pragmatic Reformers, the Activist Greens have little faith in technology and institutional solutions and view technology as culpable for environmental degradation ($M = 3.33, SD = .500$). Activist Greens do not trust that technology will solve environmental problems ($M = 2.22, SD = .972$) and favor engaging in grassroots action ($M = 3.22, SD = .441$) more than other groups.

Ecomodernists (n=3)

The Ecomodernists are the smallest and most uniform sub-group. All members were aged 25-34, Caucasian, and hold college or post-graduate degrees. The Ecomodernist sub-group believes in a hands-on approach to environmental problem solving, rejecting the idea that “nature would be at harmony if human beings would just leave it alone” ($M = 1.33, SD = .577$) or that “everything we do in modern life is harmful to nature” ($M = 1.33, SD = .577$). The sub-group does not believe that “we are approaching the maximum number of people the earth can support” ($M = 1.67, SD = 1.15$), nor do they anticipate a “major ecological

catastrophe” ($M = 2$, $SD = 0$). Instead, they are certain that “environmental problems will eventually be solved through better technology” ($M = 3$, $SD = 1.73$), and reject the idea that technology is “causing more problems than it solves” ($M = 1.33$, $SD = .577$). With respect to the most effective scale of engagement, the sub-group agrees with most of the sample that the national ($M = 3.67$, $SD = .577$) and international scale are most important, but reject the effectiveness of individual behavior ($M = 1.33$, $SD = .577$) and grassroots action ($M = 2$, $SD = 0$) more strongly than other groups.

Ecofatalists (n=5)

All members of the Ecofatalist sub-group were 44 or younger, multi-ethnic, and highly educated (three held a post-graduate degree). This sub-group was mixed as to whether humans should “leave [nature] alone” ($M = 2.60$, $SD = .548$) and if “everything we do in modern life is harmful to nature” ($M = 2.60$, $SD = .548$). While the Ecofatalists believe that “the earth has limited room and resources” ($M = 3.20$, $SD = .837$), this sub-group is not sure whether overpopulation is yet a problem ($M = 2.80$, $SD = .447$). While they reject technology less strongly than the Activist Greens, they do believe that “technology causes more environmental problems than it solves” ($M = 3$, $SD = 0$) and disagree that “environmental problems will eventually be solved through better technology” ($M = 2.20$, $SD = .447$). With respect to scale, Ecofatalists had the lowest levels of faith in national laws and policies ($M = 3$, $SD = .707$) and international agreements ($M = 2.60$, $SD = .548$) of all sub-groups. Ecofatalists also had the highest amount of faith in the effectiveness of “people making small changes in their daily lives” ($M = 3.82$, $SD = .548$).

Sub-Group Differences

Unsurprisingly, one-way ANOVA testing showed that the items that most differentiated the sub-groups were the items used to create the segmentation. Activist Greens scored significantly higher on “almost everything we do in modern life is harmful to nature” than did the other groups ($F(3,18) = 9.116$, $p = .001$), which is largely attributable to the difference shown by a post-hoc Tukey test between the Activist Greens and Ecomodernists ($p = .001$) and the Activist Greens and the Pragmatic Reformers ($p = .040$). The role of technology proved to be one of the most strongly discriminating items in the data set, with ANOVA results

showing significant variation when it came to the item “technology causes more environmental problems than it solves” ($F(3,18) = 23.976, p = .000$). Ecomodernists and Pragmatic Reformers both had significantly more faith in technology than Activist Greens ($p = .000$) and Ecofatalists ($p = .001$). All groups except the Ecomodernists were pessimistic as represented by the item, “we will experience a major ecological catastrophe if society continues on its present course” ($F(3,18) = 26.901, p = .000$). Ecomodernists also differed from the other sub-groups on the basis of variables not included in the segmentation such as believing much less strongly in the statement “nature would be at harmony if human beings would leave it alone” ($F(3,18) = 4.269, p = .019$). The Ecomodernists also scored much lower than the Pragmatic Reformers ($p = .007$) and the Activist Greens ($p = .002$) with respect to the item “the earth has limited room and resources” ($F(3,18) = 7.384, p = .002$). Ecomodernists scored significantly lower than the Pragmatic Reformers ($p = .015$) on the item “we are approaching the maximum number of people the earth can support” ($F(3,18) = 3.951, p = .025$). Sub-groups also differed with respect to their belief that people can make a difference by making small changes in their daily lives ($F(3,18) = 17.27, p = .000$). A post hoc Tukey test revealed that the Ecomodernists believed that individual action is less important than all other groups, including the Pragmatic Reformers ($p = .001$), Activist Greens ($p = .001$), and the Ecofatalists ($p = .000$). People working together in small groups also proved significant ($F(3,18) = 7.223, p = .002$) with Activist Greens and Ecofatalists ($p = .005$) believing that working together in small groups was more important than did the Ecomodernists ($p = .002$).

Content Analysis and Case Studies

Study participants generated a total of 183 elements ($n = 22, M = 8.4, SD = 1.4$) and Cohen’s κ was run to determine if there was agreement between the two coders based on the criteria established by Landis & Koch (1977). There was moderate agreement (interrater agreement = 86%, $\kappa = 0.068, p < 0.000$) after the initial round of coding. The coders discussed the categories to identify the source of the disagreement and revised the categories accordingly. A second round of blind independent coding showed strong agreement (interrater agreement = 99.5%, $\kappa = 0.994, p < 0.000$). A total of 135 constructs were generated by participants

($n = 22$, $M = 8.22$, $SD = 1.41$) which resulted in 270 construct poles. Content analysis showed strong levels of intercoder reliability after two rounds of independent coding. Agreement was moderate to weak (interrater agreement = 72%, $\kappa = 0.198$, $p < 0.000$) before the first discussion between the independent coders, but extremely strong (interrater agreement = 96%, $\kappa = 0.602$, $p < 0.000$) after discussion and revision of the categories and blind independent recoding. The number of times an element category was mentioned by a group was summed and divided by the number of group members to normalize for group size. Thus the value represents the average number of times each element was mentioned by each group member (see Appendix E for Crosstabulations of Content Analysis by Cluster).

The Repertory Grid of the participant closest the center of each sub-group was selected for in-depth analysis. The cluster analysis function of GridSuite was used to group variables (elements and constructs). Similarities lower than 75% were deemed statistically insignificant per Ackenberg & Prapasawudi (2009). Principal component analysis computes the level of correlation between rows then orders the relationships based on the amount of variance they explain. This was done using a standard varimax rotation with a 75% correlation threshold established as the significance level. A sufficient number of dimensions were analyzed to explain 80% or more of the total variance. Typically, the participant closest to each cluster center was selected for in-depth analysis. When multiple respondents were equidistant from the cluster center, a single member was chosen based on the coherence of their grid (see Appendix F for Participant Distance from Cluster Centers).

Pragmatic Reformers

Pragmatic Reformers did not disproportionately discuss a single element². Relative to the other groups, they received moderate scores on green technology ($M = 1.80$), policy and regulations ($M = 1.40$), reducing resource consumption ($M = 1.20$), and political ($M = 0.40$) and apolitical ($M = 0.80$) lifestyle behaviors. No group members mentioned adaptation/planning ahead or recycling. With respect to the

² The exception was “education and awareness” where they scored higher than all other groups ($M = 1.20$) but this was highly skewed by a single participant.

constructs, Pragmatic Reformers scored in the moderate range when compared to other groups in areas such as economics ($M = 1.20$), or similarly to other groups on issues such as social change ($M = 1.60$). They mentioned time more frequently than all other groups except the Activist Greens ($M = 1.40$) and technology more than other groups except the Ecomodernists ($M = 1.60$). Areas in which they scored lower than other groups included degree of difficulty ($M = 0.80$), degree of upheaval ($M = 0.20$), and individual attitudes, values, and behaviors ($M = 0.20$).

Respondent 3 was closest to the Pragmatic Reformer cluster center (0.566). This respondent's elements clustered into three categories, each with two elements (see Figure 4.1). "Biodiversity conservation" and "organic farming" (89% matching) were seen as space-intensive, costly for consumers, and needing collective effort to be enacted. "Vegetarianism" and "low-emissions transportation" (82% matching) were seen as less space intensive, inexpensive, and benefitting all species. "Zero-emissions energy" and "urbanization" (79%) were rated moderately. The respondent's seventh element, geoengineering, did not cluster with the other solutions and was characterized as expensive, collective, high technology, increasing GDP growth, and benefitting humans. "Benefits humans/benefits all species" and "preventative/reactive" (79% matching) were the only set of constructs that met the significance level. The first two components explained 83.72% of the variance. The first component (59.97% of variance) had the strongest loadings from "indifferent to effect on GDP growth/enabling GDP growth" (-0.94 loading) and "low technology/high technology" (-0.90 loading). The second component (23.75% of variance) included "uses more space/uses less space" (-0.98 loading) and "inexpensive to consumer/expensive to consumer" (-0.89 loading) (see Figure 4.2).

Figure 4.1

Pragmatic Reformer (Respondent 3) Repertory Grid and Cluster Analysis

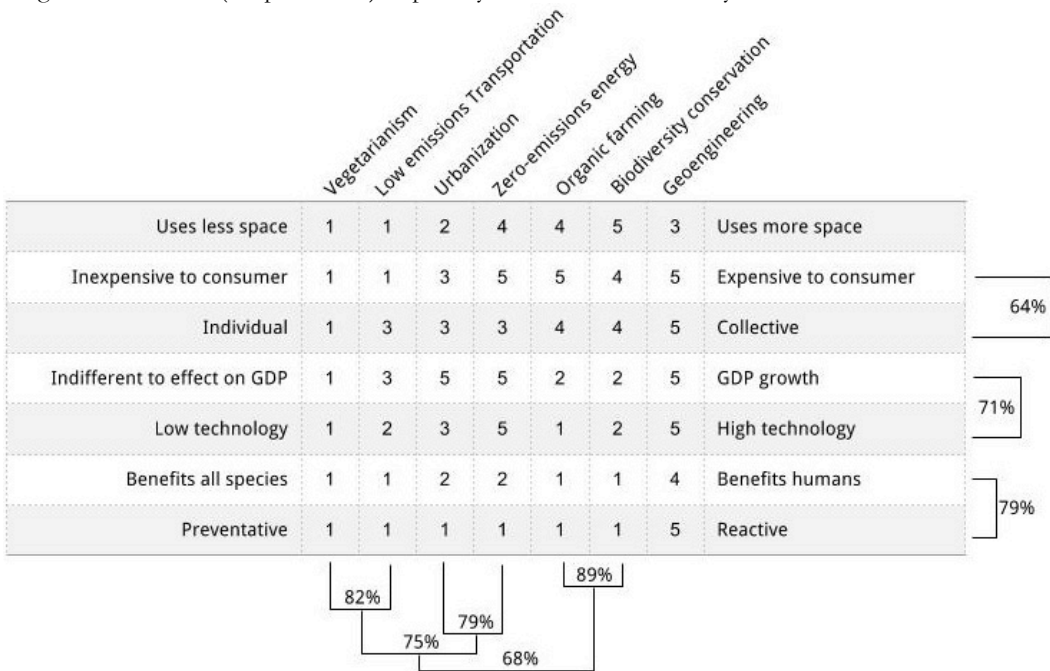
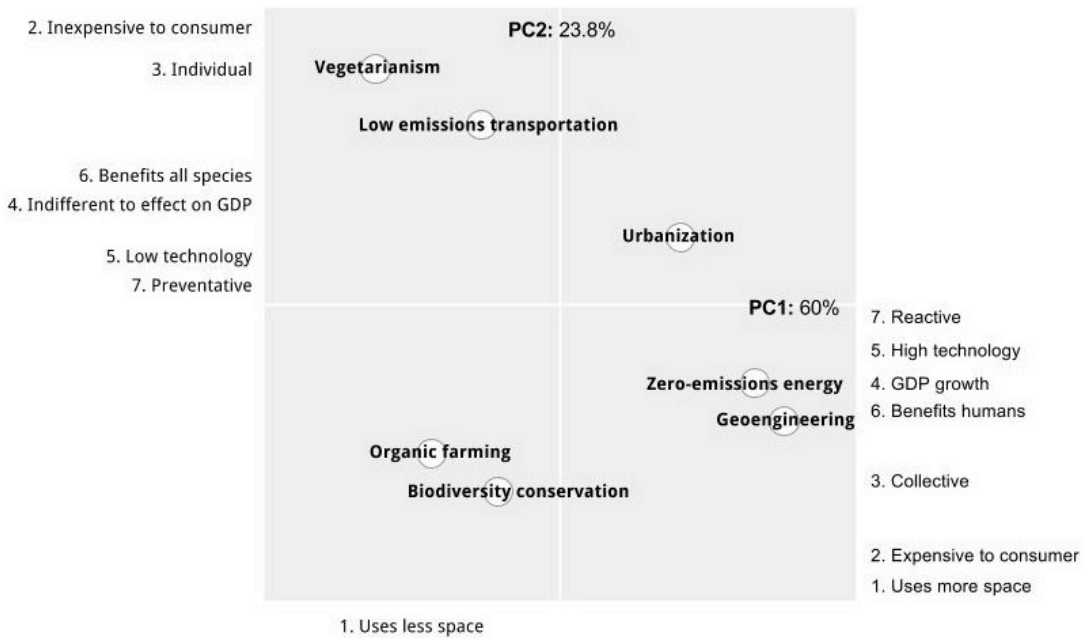


Figure 4.2

Pragmatic Reformer (Respondent 3) Repertory Grid Principal Component Analysis



Activist Greens

Activist Greens focused on policies and regulations ($M = 1.78$), mentioning them more than other groups and more than other element categories. They also focused on individual political lifestyle behaviors ($M = 1$), education and awareness ($M = 1.11$), and reducing resource consumption ($M = 1.22$). They had the lowest score of all groups on technology ($M = 1$) and preservation ($M = 0$). With respect to the constructs, they were relatively moderate, though they scored higher than all other groups on time ($M = 1.66$), individual attitudes, values, and behaviors ($M = 0.89$), importance of the solution ($M = 0.55$), and scale and place ($M = 1.00$). The only category unmentioned was land use issues.

Respondent 19 was one of two participants closest to the Activist Green cluster center (0.609). Two of this participant's solutions were 100% matching ("reducing the carbon footprint of business" and "charging businesses to emit carbon") and had some of the most extreme ratings in the grid; both were strongly characterized as private (sector), having a larger impact on emissions reductions, being harder to engage the general public, and needing less people to be effective (see Figure 4.3). "Recycling" and "conserving water" were 96% similar, and were considered passive, easier to get people involved, having a smaller impact on carbon reduction, and needing many people to be effective. "Reducing driving" and "electric cars" were 75% matching, which according to Respondent 19 need many people to be successful and have a smaller impact. With respect to the constructs, "active/passive" was 92% matching with "easier to get people engaged/hard to get people engaged". "Easier to get people engaged/hard to get people engaged" was also 75% matching with having a "larger impact on carbon reductions/smaller impact on carbon reductions". "Larger impact on carbon reductions/smaller impact on carbon reductions" was 75% similar to "need many people to be effective/need less people to be effective". Principal component analysis showed that two factors explained 96.14% of the variance. The first factor explained 86.32% of the variance and was loaded on by all constructs. The second component, explaining 9.82% of the variance, had two constructs highly correlated with it- "private/public" and "needs many people to be effective/needs less people to be effective" (both with -0.90 loading) (see Figure 4.4).

Figure 4.3
Activist Green (Respondent 19) Repertory Grid and Cluster Analysis

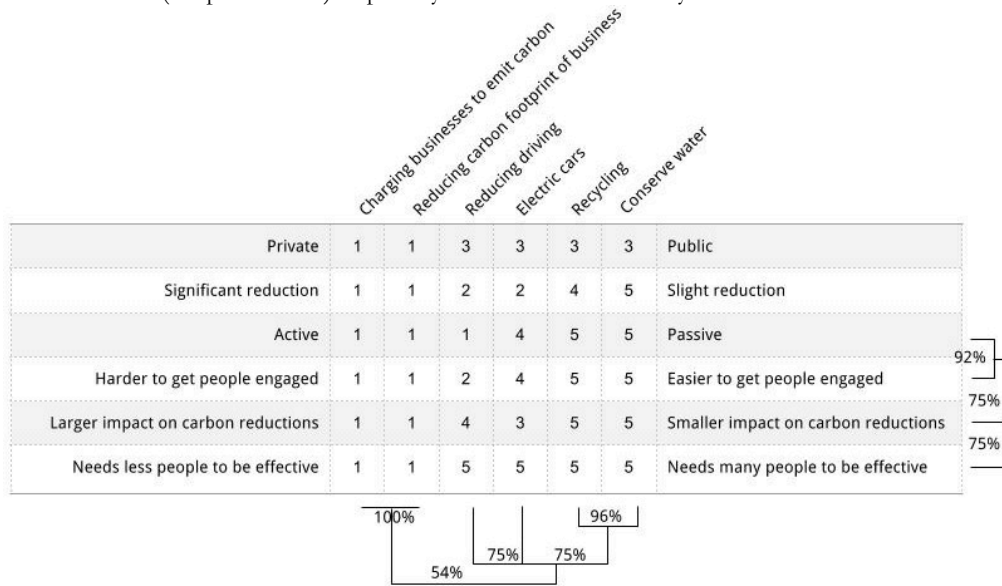
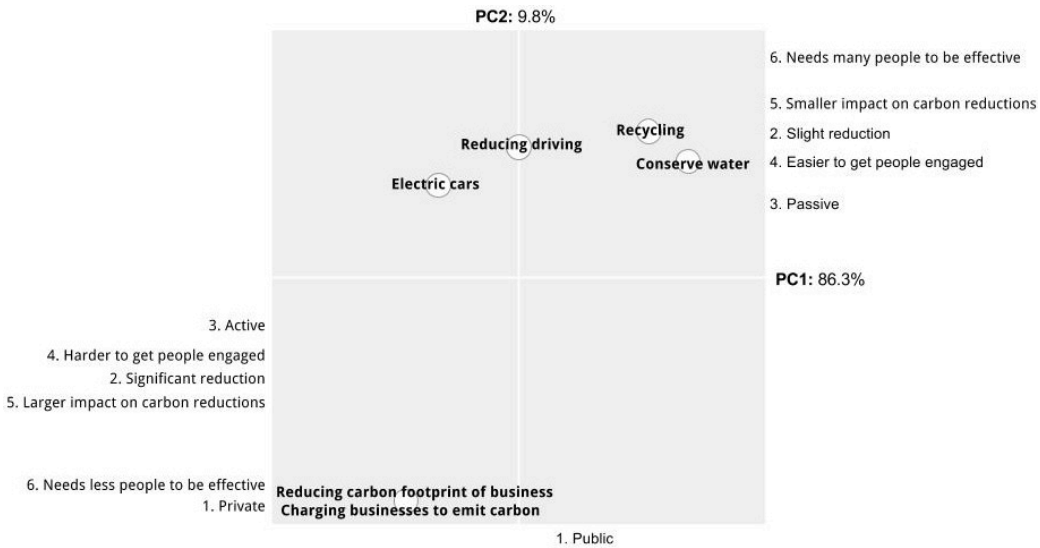


Figure 4.4
Activist Green (Respondent 19) Repertory Grid Principal Component Analysis



Ecomodernists

Ecomodernists discussed elements such as green technology ($M = 3.67$) and adaptation/planning ahead ($M = 0.67$) much more than other groups. They did not mention education/awareness or individual political lifestyle behaviors. With respect to the constructs, Ecomodernists scored higher than other groups

on technology ($M = 1.67$), degree of difficulty ($M = 2$), degree of upheaval ($M = 2$), broadness of impact ($M = 1$) and structural change ($M = 1.33$). They scored lower than other groups on economics ($M = 0.33$), social change ($M = 1.33$) and time ($M = 0.33$). Ecomodernists did not mention land use issues, ecocentrism vs. anthropocentrism, or the relative importance of various solutions.

Respondent 13 was one of the two participants closest to the cluster center (0.825). The majority of this participant's elements focused on green technologies and improved efficiency. The first cluster that emerged from the elements was "grid scale batteries" and "solar/wind power" (82% matching), characterized by the participant as high technology, requiring no lifestyle change, being accepted by the public, and being exciting (see Figure 4.5). The second cluster consisted of "recycling" and "public transit" (82% matching), which largely scored near the mean except for being very tangible (vs. abstract). One cluster emerged from the constructs- "high technology/low technology" and "no lifestyle change/ lifestyle change" (97% matching). The first two components generated by the PCA explained 87.4% of the variance. The constructs with the highest loadings on the first component (55.5% of variance) were "low technology/high technology" (-0.64 loading) and "lifestyle change/no lifestyle change" (-0.76 loading). The second component (31.9% of the variance) includes three strongly loading constructs- "public acceptance/public skepticism" (0.97 loading), "distributed/centralized" (0.91 loading), and "individual/collective" (0.87 loading) (see Figure 4.6).

Figure 4.5
Ecomodernist (Respondent 13) Repertory Grid and Cluster Analysis

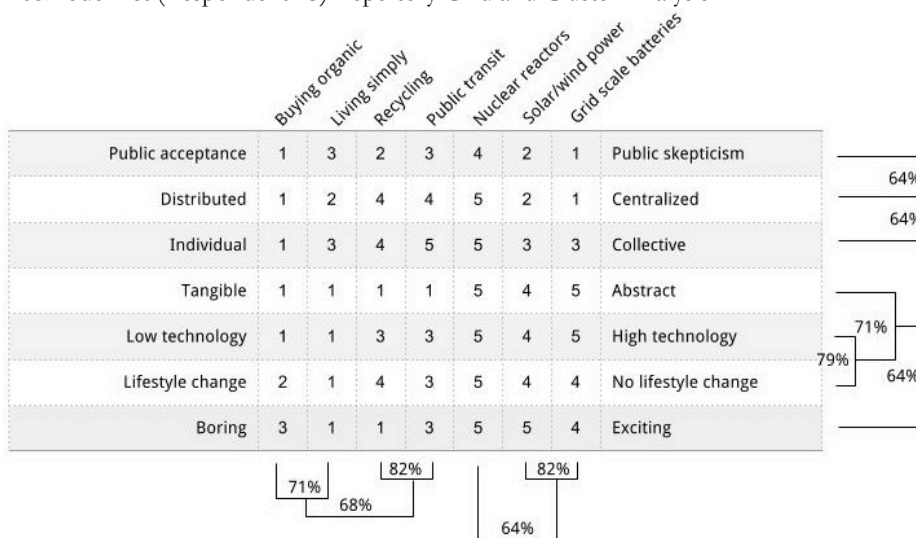
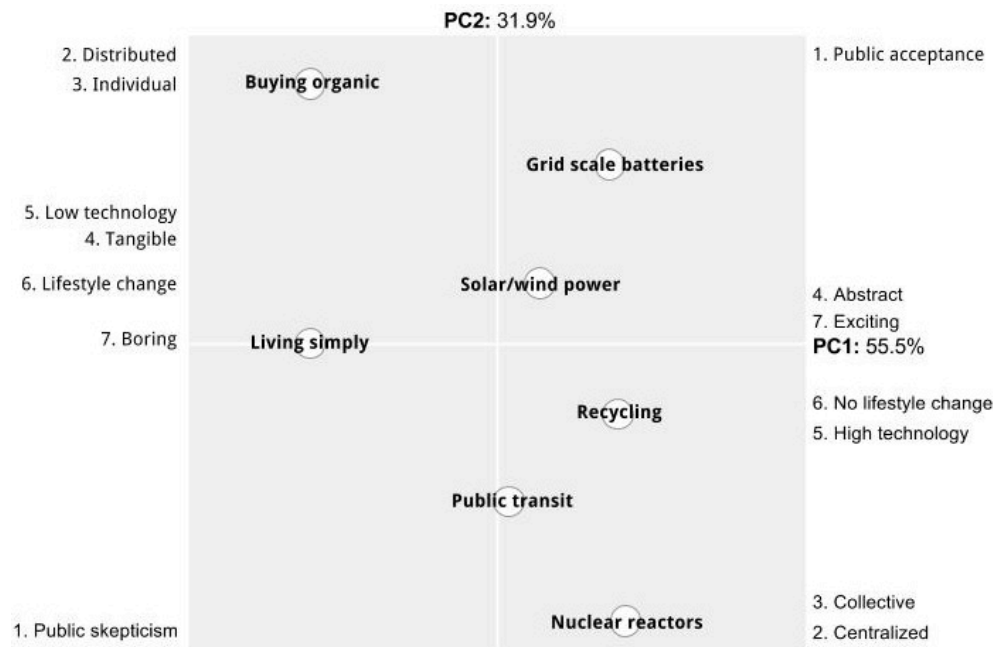


Figure 4.6
Ecomodernist (Respondent 13) Repertory Grid Principal Component Analysis



Ecofatalists

Ecofatalists overall scored moderately on policies and regulation ($M = 0.60$) and green technology ($M = 0.80$) when compared to the other groups, and scored higher than other groups on solutions that individuals could enact with little outside support such as recycling ($M = 0.60$), reducing resource consumption ($M = 2.0$), and decreasing traditional car dependence ($M = 1.20$). Ecofatalists did not mention education and awareness as being effective ($M = 0.20$) with only Ecomodernists scoring lower. Regarding the constructs, Ecofatalists differentiated solutions based on economic issues ($M = 3.20$), social change ($M = 1.60$), and land use issues ($M = 1.60$) and neglected to mention degree of effectiveness, importance, scale and place, ecocentrism and anthropocentrism.

Respondent 14 is one of the three participants closest to the cluster center (0.577). While this participant's elements were diverse, they were all activities that an individual could engage in on a tangible level. Cluster analysis revealed two clusters, each with two elements. The first was "residential solar" and "better home insulation" (89% matching), while the second cluster consisted of "drive less" and "buy less

stuff” (82% matching) (see Figure 4.7). Cluster analysis of the constructs showed one match (75%) between “leave home/stay home” and “collaboration required/no collaboration required”. Principal component analysis revealed that the first two components explained 82.88% of the variance. The first (55.3% of the variance) was defined by “stay home/leave home” (-0.97 loading), “no collaboration required/collaboration required” (0.77 loading), and “personal behavior/consumer behavior” (-0.78 loading). The second component included “costs money/free” (0.76 loading), and “smart consumption/less consumption” (0.98 loading) (see Figure 4.8).

Figure 4.7
Ecofatalist (Respondent 14) Repertory Grid and Cluster Analysis

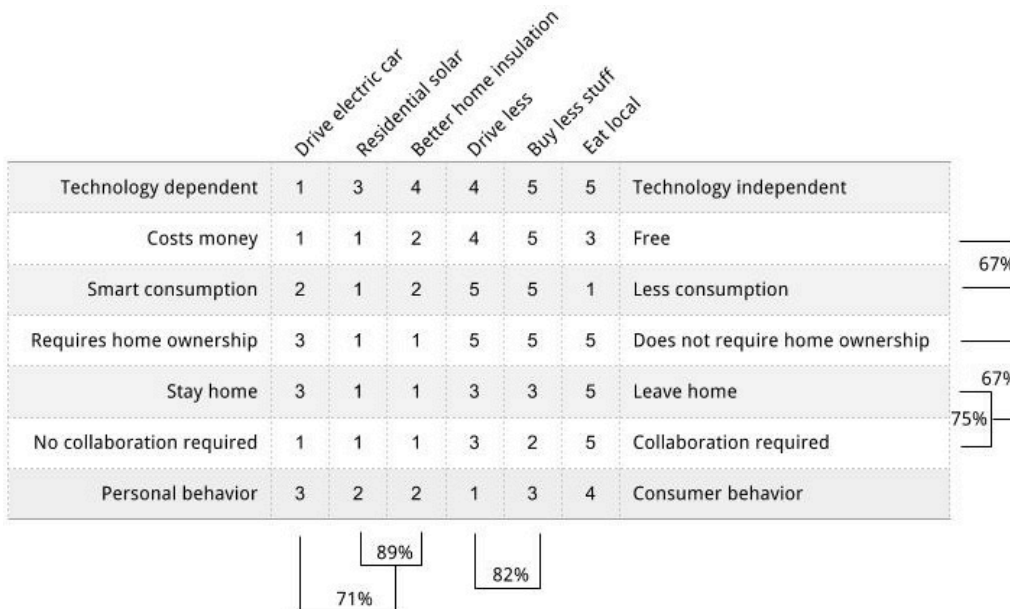
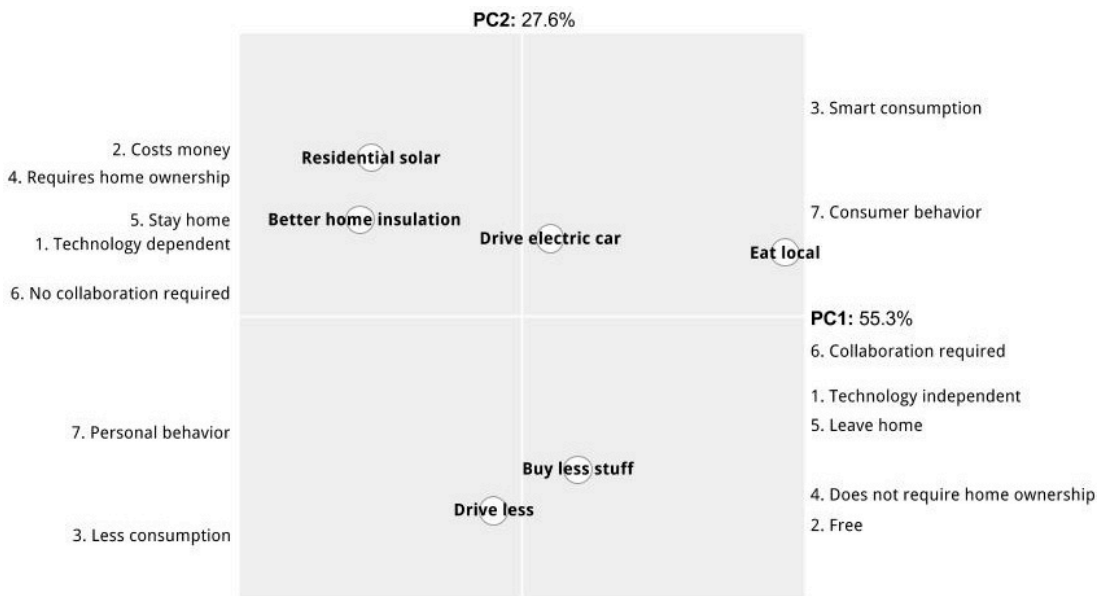


Figure 4.8
Ecofatalist (Respondent 14) Repertory Grid Principal Component Analysis



Discussion

This study fundamentally calls into question the assumption made by Dunlap and Van Liere that environmentalists will respond to a set of questions relating to the environment in similar ways. While the sub-groups answered similarly to items such as belief in action at the national scale, items regarding technology strongly differentiated the sample. Further, this study added to traditional segmentations (e.g., Leiserowitz, Maibach, & Roser-Renouf, 2009; American Enviroics, 2009; Anable, 2005) by utilizing a single individual as a case study, which humanized and provided nuance to each sub-group. Pairing quantitative survey research with in-depth case studies proved mutually reinforcing. The groups that came out of this study also bore a marked resemblance to Nisbet's typology (Nisbet, 2014) corroborating the findings of both research projects and suggesting that the results merit further exploration. They also reflected the hypothesis that contemporary environmentalists are differentiated based on their views of nature, society, and technology, with the addition of catastrophism indicating a fourth key way in which participants were distinguished from one another.

The Pragmatic Reformers, who resemble Nisbet's (2014) Smart Growth Reformers, represent a departure from the NEP in their practicality. Highly concerned about environmental issues, this sub-group does not allow their ethical stance to foreclose potential solutions to environmental problems. For this reason they are accepting of technology and believe in the efficacy of action at multiple scales. Pragmatic Reformers are highly aware of established legal and economic frameworks, and prefer to work within pre-existing systems than propose radical structural changes. Content analysis of the Pragmatic Reformer grids reflect the way in which this sub-group views environmental problem solving as multi-pronged. At least one group member mentioned almost every element category, and the bulk of their scores were moderate when compared to other groups. Their acceptance of technology was demonstrated by their relatively high rating of the technology construct, and their patience and pragmatism was reflected by the high rating this subgroup gave the time construct. Given the status-quo solutions they are prone to support, it's unsurprising that the Pragmatic Reformers did not focus on the degree to which solutions would be difficult or cause social upheaval. Respondent 3 exemplifies the "pragmatism" of this sub-group as their solutions to climate change were diverse and multi-scalar, including traditional conservation efforts, individual behaviors, green technologies, and legal solutions. This respondent also demonstrated level-headedness in their recognition of the impact of various solutions on GDP growth and space intensiveness. The Pragmatic Reformers were willing to restructure their preconceptions in light of what would be achievable, making their approach to problem solving complicit with established social and economic structures.

The Activist Greens, similar to Nisbet's Ecological Activists (Nisbet, 2014), are the direct heirs to the pro-environmental worldview as measured by the NEP. Their skepticism of technology and the broader global economic system make them unable to trust the market to create pro-environmental outcomes. This sub-group does, however, possess immense faith in the power of small groups to advocate for litigation like carbon taxation and limiting emissions. Content analysis of Activists Green grids demonstrates their faith in individual political engagement and the ability of that engagement to change the broader political system. They believe that education and awareness, as well as reducing one's individual environmental footprint, can positively affect change. Respondent 19 exemplifies the Activist Greens through an emphasis on collective

impact through small, individual behaviors. This respondent's assessment of the effectiveness of various solutions was largely dictated by the challenge of engaging others, which was contingent on the ease of incorporating solutions into one's daily life. The Activist Green's model of social change, which focuses on grassroots action and political engagement is inconsistent with younger participant's skepticism about institutions (Pew Research Center, 2014).

Ecomodernists differed most dramatically from other groups. This sub-group was highly pro-technology, optimistic, and lacked suspicion about the political and economic power structures that may constrain pro-environmental outcomes. Content analysis of their grids clearly demonstrated core aspects of their broader worldview. Their elements disproportionately focused on technology and adaptation, which they advocate (see Lind, 2012), while dismissing individual behavior and education and awareness. Their constructs focus on technology (such as geoengineering and nuclear power) while recognizing the degree to which these technologies would prove difficult to enact and cause substantive social upheaval. The Ecomodernists did not discuss economic constraints, a broader tendency for which they have been publically critiqued (e.g., Robbins & Moore, 2015). Respondent 13 exemplified Ecomodernism through his/her focus on green technologies and efficiency, as well as the omission of political solutions. This Ecomodernist harbored an obvious lack of faith in changing individual behavior, demonstrating how they view technological solutions as bypassing political gridlock and futile attempts at generating widespread social change (Trembath, 2015). Given the degree to which these ideas deviate from historical environmental thought and other contemporary groups, it remains to be seen how widely Ecomodernist worldviews are represented in the general population.

The Ecofatalist mindset has been documented specifically with respect to the environment (e.g., Emmott, 2013), but may be better explained by Douglas and Wildavsky's grid-group theory (Douglas, 1970). Grid group theory, amongst other things, states that societies are structured along two dimensions- group (collective to individual) and grid (hierarchical to authoritarian). In this schema, fatalists are high grid, meaning that they see external structural constraints as highly significant, and low group, meaning they are highly individualized. While these individuals are highly concerned about environmental problems, they have

little faith in the ability of institutional structures to address these concerns effectively. With respect to content analysis, the mid-range ratings of the Ecofatalists reflect their broader ambivalence about solutions being pursued beyond an individual scale. Their endorsement of recycling, reducing resource consumption, and driving less reflected their resolution that individual action is the only means of making effective change. Their lack of focus on education and awareness suggests their skepticism that others can be convinced to change their behavior. The Ecofatalists were astutely aware of the power of economic trade-offs and the overarching political and economic structures constraining effective environmental problem solving. Respondent 14 exemplified two key aspects of the Ecofatalists: their sophisticated understanding of environmental issues, and their complete disengagement from problem solving at levels higher than the individual. This participant also demonstrated the sub-group's faith, relative to others, in the power of strategic consumer behavior and minimizing one's environmental impact through reducing consumption. But this should not be conflated with belief in the power of the individual to make change—it is viewed as a last resort. Also notable about this sub-group is its ethnic diversity. The degree to which this sub-group may have experienced injustice embedded in institutions may influence their cynicism about bringing about the large scale, society-wide change necessary to engender pro-environmental outcomes. Douglas and Wildavsky might explain that Ecofatalists see outcomes as dictated by structural constraints, and they have little solidarity with other members of society.

Conclusion

This research validated the need for a multidimensional scale measuring environmental worldviews that goes beyond the diametric continuum typical of established scales. Rather than respond in a consistent and uniform way, respondents formed internally consistent sub-groups. At the same time, each respondent was shown to be unique in how they made sense of environmental problems and their solutions. This study went beyond simply critiquing the NEP and calling for its replacement, instead demonstrating what aspects of the scale prove useful and what needs updating. Certain themes from the original scale, such those pertaining to the role of technology, did not sufficiently capture the views of contemporary environmentalists. However

respondents answered similarly to items within the sub-dimensions Dunlap added *after* the original scale was vetted, namely the recognition of fundamental limits to growth and the possibility of an impending ecological crisis. This study achieved its objective of providing a point of departure for a revised and updated scale. From here, the themes brought forth by participants can be operationalized, validated, and explored with respect to their representativeness within the general population.

Three cautions should be kept in mind moving forward. First, while many established items proved powerful differentiators between respondents, other themes that weren't offered or regularly volunteered may also prove important. For example, political affiliation is increasingly recognized as a proxy for pro-environmental attitudes (Kahan et al., 2012) and should be addressed systematically in future research. Second, caution should be made when connecting pro-environmental worldviews with support for political initiatives, as initiatives can appeal to multiple priorities such as green jobs (which address economic concerns) or reducing fossil fuel imports (which can appeal to patriotism). This means that broadening the typology to include individuals with priorities *other* than "the environment" is critical. Third, grouping respondents into their sub-group may be strategic theoretically and politically, but does not sufficiently illustrate the unique way in which each individual makes sense of the world. It is critical to investigate respondents who reside near the fringes of the identified sub-groups, who share certain characteristics of more than one group, or who harbor truly unique worldviews, in addition to making generalizations.

This is not to presume that a scale based on these findings will be applicable universally and temporally; rather, like any scale, it will be situated. Environmentalism is a movement with a well-established history but many internal factions. Environmental worldviews are complex amalgams of attitudes and values, mediated by knowledge, and processed affectively. Any useful scale will require humility on the part of the researcher, as well as dogged attention paid towards the manifestation of contemporary environmentalism and environmentalists (even when they are not called as such). This does not make quantitative scales unimportant, quite the converse. Developing a robust environmental typology remains critically important given that these worldviews influence how individuals and groups engage in the world, socially, economically, and politically.

CHAPTER 5

CONCLUSION

This dissertation explored the worldviews of contemporary American environmentalists. While the New Environmental Paradigm scale has enabled social scientists to measure changing environmental attitudes and values, the scale defines environmentalism narrowly and has not been sufficiently updated to reflect the evolving social and environmental context. Alternative typologies have addressed some of the NEP's analytical and theoretical issues, but remain problematic due to their tendency to either be unidimensional or thought exercises that are not validated empirically (Proctor, 2016). This project provides the foundation for developing an updated New Environmental Paradigm scale by broadening the definition of what constitutes pro-environmental thought. The sample studied consisted of participants with strong environmental identities and diverse demographics, attitudes, values, and behaviors. Each participant was carefully selected using a designed set of criteria, after which quantitative and qualitative data was collected using a Likert-style scale questionnaire and in-depth Repertory Grid interviews. The survey data allowed for comparisons between participants, while the interviews created robust portraits of how each individual conceptualized and differentiated between climate-related environmental problems and solutions.

The dissertation was structured using the “three papers” model. The first paper (Chapter 2) chronicled the emergence of the NEP and its central role in social science research. It summarized the key analytical and theoretical critiques of the scale, ultimately concluding that the worldview measured by the NEP captures only a narrow part of contemporary environmentalism. Based on an assessment of environmental discourse, the paper suggested that the main areas in which environmentalists exhibit heterogeneity are with respect to nature, technology, and scale of societal response. Ultimately, the paper argues that the NEP merits revision on the basis that it would erroneously categorize many contemporary environmentalists as being anti-environmental.

The second paper (Chapter 3) analyzed solutions to climate change proposed by a diverse group of contemporary environmentalists. Each participant completed a Likert-style scale questionnaire and an in-

depth interview using the Repertory Grid technique. Analysis demonstrated that the environmentalists studied were quite heterogeneous. While participants agreed that environmental problems were serious and that the earth cannot accommodate unlimited demands on resources, they disagreed about the role of technology in environmental problem solving and the scale (individual, local, global) at which effective change occurs. Content analysis of the interviews showed that the most frequently volunteered solutions were green technologies, reducing resource consumption, and policy changes. Participants differentiated between these solutions based on cost, the type of social change needed to bring these solutions to fruition, and how difficult solutions would be to enact. Younger respondents were more likely to mention green technology and alternative transportation, while older respondents discussed individual political engagement, education, and awareness. Overall, this paper confirmed the heterogeneity of the sample, and suggested some broad areas in which an updated scale might focus.

The third paper (Chapter 4) used cluster analysis to group participants based on their worldviews and provided in-depth analysis of each group using multiple methodological approaches. Four groups were identified as ideologically cohesive. There were the Pragmatic Reformers, who harbored high levels of concern about environmental problems and pursue change through pre-existing social and economic systems. The Activist Greens were highly skeptical of technology, and support change-making through grassroots action and political engagement. The Ecomodernists were optimistic about environmental problem solving and support large-scale technological interventions. The final group, described as Ecofatalists, are convinced of the urgency of environmental problems but are deeply skeptical of the ability of existing structures and organizations to address environmental concerns effectively. While this group engages in individual pro-environmental behaviors, it is in reaction to the ineffectiveness of larger-scale actions rather than being proactive or optimistic about developing potential solutions. The paper concludes that these four groups comprise a suggestive typology that merits further exploration at the national scale.

Overall, the focus of this research project was hypothesis generating, with the objective of investigating a small sample in depth to lay the foundation for an updated New Environmental Paradigm scale. It succeeded in the goal of evaluating the NEP and adding to our understanding of how contemporary

environmentalists conceptualize environmental problem solving. It concluded with a renewed respect for Dunlap and Van Liere's seminal work as well as a deeper understanding of the specific areas in which the NEP should be updated to better reflect contemporary environmental worldviews.

Research Questions

A set of research questions guided the study that informed all three papers. The hypothesis presented in Paper 1 was that views of nature, technology, and scale of societal response were the primary axes differentiating contemporary environmental worldviews. The justification for these three areas was supported by academic and popular discourse, but Papers 2 and 3 validated elements of this hypothesis while not supporting other aspects.

Q1: Which dimensions differentiate the worldviews of modern environmentalists?

"Nature" is a longstanding subject of debate within environmental thought, once famously dubbed the most complex term in the English language (Williams, 1982). The intellectual roots of environmentalism are found in the Transcendentalists (e.g., Emerson, 1836; Thoreau, 1854), who saw wild places as Edenic respites from modern life. From this perspective, untouched nature is sacred and human interaction must be limited for risk of degrading its purity. A more contemporary perspective argues that nature is resilient and that humans have the responsibility to steward the planet towards an ecologically vibrant "rambunctious garden" (Marris, 2013). A third perspective, related to the second, argues that the very idea of a pure and untouched nature is problematic. This perspective, rooted in human geography, environmental history, and social theory, argues that humans have always interacted with the biophysical environment, even landscapes that appear to be the most natural (Cronon, 1995; Pyne, 1997; White, 1996). From this perspective, the question is not *whether* human engagement with nature is inherently detrimental, but rather that the very premise of a nature separate from humans is socially constructed.

Given the importance of "nature" in environmentalism's history, it is somewhat surprising that hardly any participants mentioned preservation, conservation, or the protection of wilderness, and only a few

differentiated solutions on the basis of their “naturalness”. There are multiple ways to interpret this finding. On one hand, repertory grid interviews may not be the most effective approach to capturing the sentimental or spiritual dimensions of a respondent’s belief system. Kelly’s Personal Construct theory has been critiqued for its limited ability to capture affective states (Boeree, 2006). The topic matter could also be culpable, as there may be more effective means of addressing climate change (the topic of the interviews) than wilderness protection. The importance of non-human nature and/or wilderness may have emerged if the theme of the interview had been, for example, biodiversity loss. Conversely, perhaps the attachment to pure nature *is* diminishing within pro-environmental thought. In 1989, Bill McKibben famously proclaimed that humans had reached the “end of nature”, and the prolific discussion surrounding the Anthropocene reflects a similar abandonment of purity in favor of a decidedly hybrid relationship between humans and the environment (McKibben, 1989; Nixon, 2014). Kein writes that he proposed the idea of the “death of nature” to a biologist friend of his, and she responded without much concern.

She said this was probably true, in an academic sense, but she didn’t pay it much mind. The fact remained that places...affected by human activity, were special, and ought to be protected; other places were affected far less, but they were special and needed protection, too (Kein, 2014).

Thus, the absence of discussions of nature’s purity could indicate a broader departure within environmental circles, wherein a pristine non-human nature isn’t necessary to make normative decisions that benefit humans and other species alike. In the context of the Anthropocene, Minter argues that what is needed is a “comprehensive ethical paradigm” of “restraint and moral regard” able to accommodate the need for significant interventions in ecosystems while retaining as much naturalness as possible (Minter, 2012).

Historically, much of environmental thought has been technophobic. From this perspective, technology is lambasted as the cause of environmental degradation due to its role in accelerating natural resource extraction, which exacerbates pollution, biodiversity loss, hazardous waste, and more. Further, technological progress is seen as benefitting the developed world, while the developing world must deal with the externalities. Philosophically, technology is seen as excessively hubristic, professing be able to supplant the natural with human-generated facsimiles. This technophobic perspective is more generous towards

renewable and small scale technologies, because they engender “a fundamental shift in power relations between humans and the natural world” (Klein, 2015). A different perspective is technophilia, which understands technology as enabling sustainable development and social justice outcomes, especially in the developing world. Some support technology as an effective means of environmental problem solving because it does not necessitate political or social change. More extreme holders of this viewpoint argue that geoengineering, de-extinction, and rewilding could enable radical, disruptive pro-environmental outcomes. This study found that technology remains a central topic within environmentalism, with attitudes that are divergent and occasionally contradictory. On one hand, most participants agreed that technology causes more problems than it solves. At the same time, participants also concurred that technology would enable environmental problem solving. This schism, between technology being both culpable for environmental degradation as well as the means of addressing it, was further confounded by the high number of times technology was mentioned in the interviews, both as an element and a construct. Further, technology strongly differentiated participants, seen by the high level of significance of the item, “technology causes more environmental problems than it solves” in the clustering algorithm. The degree to which it was related to other construct poles (i.e. top down, expensive, supporting economic growth) suggests that attitudes towards technology may be linked with other variables. Overall, technology proved more important than originally hypothesized.

Finally, it was theorized that views of societal response, especially as related to scale and agency, would distinguish pro-environmental worldviews. One perspective suggests that environmental degradation can be attributed to market failure, individual self-interest, and the structure of capitalism itself (e.g., Klein, 2015; McKibben, 1989; Suzuki, 1999). From this standpoint, addressing climate change without overhauling the economic structure is futile, and grassroots advocacy is the most effective way of ensuring that government stymies the worst of capitalism’s vagaries. Conversely, others believe that capitalism and environmental protection are not mutually exclusive, and that development itself is not problematic as long as it is “sustainable” (e.g., Friedman & Mandelbaum, 2011; Gore, 2006). Green libertarians hold a different outlook, perceiving the top-down organization of society itself as the root of environmental problems. They

support individual freedom and self-organization rather than political or economic decrees from above (e.g., Bookchin, 1992; Hawken, Lovins, & Lovins, 2013). There are also a range of perspectives as to the scale at which social change might emerge, from individual lifestyle behaviors, to grassroots organizing, to structural changes to the global economy and international governing institutions.

While the findings demonstrated that the sample distinguished between societal response in multiple ways, the results were suggestive rather than conclusive. There were some areas of agreement, as participants largely agreed that action at the national and international scales were critical. But participants differed dramatically as to the degree to which individual lifestyle behaviors were effective, and some respondents felt that grassroots action was the sole means of addressing environmental problems. Others rejected action at all scales but the individual. While not the most frequently mentioned element or construct, the Repertory Grid interviews showed that participants were aware of the ways in which environmental problems affected the developed and developing worlds in disparate ways.

To summarize, all three components hypothesized were mentioned by participants, but not to equal degrees and not in the manner originally envisioned. The tension between the natural and the modified did not garner as much discussion as anticipated, but the reason for this is uncertain. Technology emerged as more important than expected, in terms of frequency and the degree to which it differentiated between groups. It is unknown if technology is a proxy for other axes. Further, scale of societal response was mentioned regularly but idiosyncratically. Overall, the three hypothesized dimensions proved important to varying degrees but did not appear to encompass the full range of differentiation within the sample.

Q2 Are differences in environmentalist worldviews related to demographic variables?

Given the media coverage of the debate between new and old environmental thought (e.g., Kloor, 2012), this study explored the relationship between age and how participants made sense of environmental problems. Each era of environmentalism is associated with a particular set of attitudes and approaches to problem solving. The environmentalism of the late 1960's and early 1970's is typified as a grassroots movement, wherein public demonstrations and individual political actions (letter writing, lobbying senators)

created the legal victories that remain the hallmark of the movement (Owram, 1997). As environmentalism progressed, the movement bifurcated into the original grassroots groups and an increasingly professionalized mainstream movement (Rome, 2013). When environmentalism saw the 1990's and 2000's pass without achieving passing substantive legislation, there was a call for a change in strategy which culminated in the publication of Shellenberger and Nordhaus's *The Death of Environmentalism* (Shellenberger & Nordhaus, 2004). The popular press increasingly wrote about young "neo-environmentalists", who advocate for change differently than their environmental predecessors (e.g., E.O. Wilson, Carl Pope) (Foley, 2013; Kloor, 2012). Broadly, a longitudinal view of the environmental movement would associate an ideological perspective and an age bracket with each era, based on what was understood to be effective problem solving at the time. The orthodox view would say that late 1960's environmentalists are focused on individual behavior and grassroots social change; the 1990's and 2000's are associated with the integration of pro-environmental thought into pre-existing economic and social structures; and the 2000's and 2010's are characterized by rebellion against previous strategies, rejecting nature and embracing technology.

This research supported the hypothesis that there are differences in environmental worldviews based on age, but the schism did not prove as dramatic or consistent as portrayed in the popular press. First, while the idea of pure nature did not strongly differentiate the sample, younger respondents were *more* likely to mention conservation and preservation than older groups. The degree to which participants favored technology over other solutions appeared related to age: the youngest age groups consistently suggested green technology while older groups mentioned it much less frequently. Younger participants were also more likely to bring up reducing traditional car dependence. Policies and regulations were volunteered most frequently by members of the mid-range age brackets. Older participants, consistent with what would be expected, focused on individualized solutions like as education, awareness, and political and apolitical lifestyle behaviors. None of these tendencies, however, proved statistically significant. This may be due to the lack of a strong relationship, but more likely the small sample size was not amenable to formal analysis as many age brackets contained only one or two members. Overall, the relationships between age and worldview were suggestive but not conclusive. The connection between younger respondents and green technologies was relatively

strong, but much more systematic analysis should be conducted before generalizations can be made based on age.

Q3 Can environmentalist worldviews be grouped in ideologically coherent ways?

As discussed, there are many alternative taxonomies for grouping environmentalists according to their broader worldviews. These largely prove problematic because they share the NEP's unidimensionality (Ellis & Thompson, 1997; Eckersley, 1992; Dobson, 1998; Thompson & Barton, 1994; Devall, 1980; Nash, 1982; Steffen, 2004; Nadasdy, 2005) or are thought exercises that have not been tested empirically (Merchant, 1980; Dryzek, 1997). Even multidimensional scales (e.g., the Integral Ecology Scale, the Environmental Attitudes Inventory) can be reduced to two-dimensions and contain too many question items to be fielded on a short survey as can the NEP (Proctor, 2016). A succinct scale that represents the breadth of contemporary environmentalism will be the most viable vehicle to update the NEP (Bernstein & Szuster, forthcoming).

Nisbet's taxonomy of the attitudes of public intellectuals on climate change was one of many sources reviewed in the work leading up to this research (Nisbet, 2014). Using discourse analysis of public intellectuals' attitudes towards climate change, Nisbet categorized environmentalists into three groups- Ecological Activists, Smart Growth Reformers, and Ecomodernists. The Ecological Activists, typified by public intellectuals like Bill McKibben, Naomi Klein, and Clive Hamilton, are deeply skeptical of the ability of capitalism to address environmental problems. They are catastrophic, skeptical of technology, and support grassroots organizing as a means of social change. Nisbet's Smart Growth Reformers (Al Gore, Jeffrey Sachs) believe that change can be achieved through the capitalist system by utilizing ecological economics, legislation, and sustainable development. Nisbet's third group, the Ecomodernists (Andrew Revkin, Nordhaus and Shellenberger, Mark Lynas) advocate for government investment that supports innovation, technologies like nuclear and natural gas, and are optimistic about the future.

Nisbet's three-group solution is not tested empirically and has a narrow scope. However, it was reflected in the strongest segmentation of participants interviewed for this project. Nisbet's Ecological Activists bore similarity to the Activist Greens in their distrust of technology and capitalism, and their belief

in the power of grassroots action to engender social change. His Smart Growth Reformers were similar to the Pragmatic Reformers in their acceptance of technology and general faith in the existing social structure to create pro-environmental outcomes. Nisbet's Ecomodernists, with their support of technology, optimism, and skepticism towards the power of individual behavior, were similar to the Ecomodernists in this sample. But this segmentation, with its in-depth interviews with environmentalists versus discourse analysis of public intellectuals, elucidated aspects of each group not articulated by Nisbet. For example, this study showed that the Pragmatic Reformers were less ideologically mired in a single solution to environmental problem solving than other groups. They embraced multiple, occasionally contradictory approaches to achieving pro-environmental outcomes and were less concerned with their ethical or philosophical underpinnings. While the Ecomodernists described by Nisbet were quite similar to the Ecomodernists in this sample, the repertory grid interviews suggested that they were less attached to political solutions than Nisbet's typology suggests. While public intellectuals associated with Ecomodernism are careful to state publically that they are focused on government investment in innovation rather than free-market capitalism and technology, the Ecomodernists in this sample largely deigned to mention political solutions. The convergence between Nisbet's typology and this typology affirms both of their credibility, while this study adds nuance to Nisbet's work.

Diverging from Nisbet, this research identified a group labeled Ecofatalists. This fourth group bears resemblance to the loosely defined "Ecolibertarians" and the Fatalists from grid-group theory (Douglas, 1970). Latour (1991) infamously stated that post-modernism was not a break from modernism, but rather "disappointed modernism". This idea of "disappointed modernism" is helpful when describing the Ecofatalists. While these individuals have a sophisticated understanding of environmental problems and are quite convinced of their severity, they have little faith in the ability of institutional structures to address these challenges effectively. They expressed ambivalence about various approaches to environmental problem solving, reflecting their contradictory desire for effective solutions and their belief that any proposed solution is unlikely to be implemented effectively. This sub-group is astutely aware of economic trade-offs and the overarching political and economic structures constraining successful environmental problem solving. Ultimately, they do not believe that environmental concerns will be put before economic concerns, and

subsequently support a variety of small-scale solutions such as recycling, reducing resource consumption, driving less. These solutions are, however, less of an endorsement to their effectiveness, but instead reflect the belief that the individual is the only true scale at which one has agency. Their lack of attention to education and awareness suggests that they are skeptical that others can be convinced to change their behavior. Also notable about this sub-group is its racial diversity. The degree to which they have experienced injustice embedded in institutions may influence their cynicism about bringing about the large scale, society-wide change needed to solve environmental problems. In short, Ecofatalists believe that an environmental catastrophe is inevitable if society does not change, and while they would like to do good in the world, they deeply distrust that existing economic and political structures are capable of making the necessary society-wide changes. They engage in small scale behaviors despite knowing they will be insufficient to address the scale of the problem.

This segmentation should be interpreted as suggestive, meriting further examination, but far from conclusive in its present state. First, the sample is too small to convincingly argue that these sub-groups are representative of the larger population of environmentalists. Second, there are issues with the segmentation process itself. Groups defined through cluster analysis are never internally homogenous. The segmentations were based on patterns of responses to a set of quantitative question items, but the repertory grids showed that the way each respondent conceptualized environmental problem solving was unique. Further, the clustering algorithm is forced to assign each participant to a single group. There are inevitably respondents who harbor characteristics of multiple groups or who otherwise defy easy categorization. Finally, there is diversity and inconsistency *within* groups, and even further, within each individual. For example, the Ecological Activists, despite professing skepticism towards technology in the questionnaire, mentioned it regularly as a solution to climate change in the repertory grid interviews, embracing it in some contexts and rejecting it in others. Other participants suggested solutions begrudgingly, as if they were conflicted about sanctioning a reality they didn't fully endorse. Caution should always be exerted when interpreting and acting upon typologies as they appear deceptively straightforward, and a larger sample size is imperative to the validation process.

Q4 Does the existing New Environmental Paradigm scale capture the breadth of contemporary environmental worldviews?

Based on this sample, this project indicated that the New Environmental Paradigm scale does not capture the breadth of contemporary environmental worldviews. The participants, who care deeply about environmental issues, work for environmental organizations, and prioritize environmental protection, would have received very different scores on the New Environmental Paradigm scale. There was convergence around certain topics, and with few exceptions (the Ecomodernists), respondents agreed that the earth's resources were limited and that unless there was dramatic change, an environmental catastrophe would likely occur. Another area of agreement was with respect to economic concerns, as respondents discussed environmental problem solving as a cost-benefit analysis. The New Environmental Paradigm scale does not measure attitudes towards cost or the economy. The participants also differed on many other topics. Respondents were split as to whether human society should engage with nature or simply "leave it alone". Despite the agreement surrounding the existence of planetary boundaries, there was disagreement as to whether those boundaries were close to being reached. The issue of scale was another topic where participants both converged (around the importance of action at the national and international scales) and diverged (around the importance of individual behavior and grassroots groups). The scalability of solutions and the associated loss of individual agency was discussed by many participants. This deserves further examination given the importance of scalability underlying broader debates within environmentalism and social justice (e.g., Robbins & Moore, 2015). Overall, the NEP did not appear to capture the breadth of contemporary environmental worldviews given the multitude of ways participants responded to the questionnaire items and the number of additional topics participants suggested in the Repertory Grid interviews.

Certain items from the NEP also appear dated in light of changing environmental problems and the recognition of an increasingly human-modified planet. As Kein (2014) writes, even advocates of wilderness protection recognize that all landscapes are, in some ways, modified by humans. Given the extent of global climate change, whether or not humans *should* engage with nature may be beside the point. The NEP construct "belief in an inherent balance of nature" includes the items "the balance of nature is very delicate

and easily upset”, “the balance of nature is strong enough to cope with the impacts of modern industrial nations”, and “when humans interfere with nature, it often produces disastrous consequences”. Participants in this study largely did not mention the purity of nature, wilderness, or conservation, nor did they express yearning for an era where humans could simply let nature take care of itself. In general, they embraced (occasionally begrudgingly) green technologies, and support for reducing (rather than eliminating) humankind’s planetary footprint. Measuring the degree to which respondents believe that humans shouldn’t interfere with nature is likely to increasingly be at odds with the recognition that it is unavoidable.

Originally, the “New Environmental Paradigm” was conceptualized in opposition to a “Dominant Social Paradigm” which prioritized economic development and technological progress over environmental protection. Many contemporary environmentalists do not see these as incompatible. This either supports the view that the movement has become so diffuse as to be meaningless (Bosso, 2005), or it speaks to the tremendous progress the movement has made in obliging that environmental protection be compatible with other social goals. At present, the NEP leaves out a broad swath of environmentalists who are not opposed to a “Dominant Social Paradigm”, but rather have grown up with environmentalism incorporated into the existing social and ecological framework. As any social movement evolves, the core ideological underpinnings will be modified by the broader social context. Environmentalism has become more diverse, diffuse, and multidimensional. As Lalonde and Jackson described, the New Environmental Paradigm scale in its current incarnation may have outlived its usefulness (Lalonde & Jackson, 2002).

Q5 Which aspects of the NEP scale deserve to be retained, revised, or removed?

First, the NEP’s contribution to social science research cannot be underestimated. Developing and vetting a succinct set of 15 powerful survey items, especially ones that remain in worldwide use after 40 years, is no easy task. To argue that the NEP should be replaced with a brand-new scale would be shortsighted, and face challenges similar to those that many other alternative scales have faced. Based on this research, it is suggested that an updated scale should be multidimensional. Instead of employing a unidimensional scale with sub-constructs per the NEP, a new scale should entertain that attitudinal dimensions underlying

environmental worldviews are potentially orthogonal. The paradigm where a respondent is more or less of an environmentalist should be supplanted with the idea that there are multiple ideologically coherent ways to be pro-environmental.

Based on this research, an aspect of the NEP that should be retained but modified is the question item, “if things continue on their present course, we will soon experience a major ecological catastrophe”. The participants in this study largely agreed with this statement, but it may not represent catastrophism or fatalism as suggested by Dunlap (2008). As the question states, there is the possibility of a crisis *should society continue on its present course*. Subsequently, the question item should be amended to accommodate the demonstrable differentiation between respondents, which is whether they believe (1) society will continue on its present course and, (2) whether individuals have agency in altering it. While the sub-construct, “belief in an inherent balance of nature” proved useful in differentiating respondents, it may become less relevant should the Anthropocene maintain widespread recognition. Very few respondents volunteered constructs or elements that referred to nature’s purity, especially when compared with solutions that embodied human-environment interactions that benefited both people and biophysical systems. The idea of a hands-off approach to environmental problem-solving (“nature would be at harmony if human beings would leave it alone”) may become less relevant as humans are increasingly forced to be planetary stewards. But as previously discussed, this deserves further research before premature conclusions are drawn.

Another aspect of an updated NEP is its measure of attitudes towards technology. Attitudes towards technology varied dramatically within the sample, with outright rejection by some and embrace by others. Many participants were critical of previous technologies, blaming them for causing environmental degradation, but at the same time technology was regularly mentioned in the interviews as both an element and a construct. Technology is addressed vaguely in the NEP, through question items like “humans have the right to modify the natural environment to suit their needs” and “when humans interfere with nature, it often produces disastrous consequences”. These items only ambiguously allude to technology. New items should include a finer differentiation between types of technology- even if a participant endorses “clean energy”, it is impossible to tell what type (solar, wind, nuclear, hydropower) or scale (residential or industrial) they support.

While risking making a scale dated, it has implications for attitudes and behaviors. Further, there should be more research conducted on psychological constructs that are connected with attitudes towards technology, including trust in authority, risk perception, economic growth, and attitudes towards time. After more exploration and vetting, a nuanced measure of technophilia and technophobia should be integrated into a revised scale.

“Scale of effective engagement” is another item not included in the NEP, but its inclusion should be considered in an updated scale. Participants largely agreed about the importance of acting at the national and international scales, while they strongly disagreed about the effectiveness of the individual and lifestyle changes in affecting environmental progress. Many respondents also conflated scale of engagement with agency and effectiveness. While the individual scale was where they *could* engage, many recognized that its effectiveness was limited when compared with higher levels of engagement. At the same time, participating globally represented a loss of individual agency and thus the risk of ineffectiveness. This tension between scale of engagement and effectiveness should be explored further.

Environmentalism Today

The findings of this research not only shed light on how the NEP *should* be changed, but they demonstrate important ways in which environmentalism has evolved in the context of emergent social, political, and environmental factors. While this forum is insufficient to provide a full assessment of contemporary environmental thought, a few themes generated within the context of this research prove suggestive.

One is the lack of affiliation with the term environmentalism, and the broader trend of addressing social problems through individual rather than collective action. This mirrors demographic changes, characterized most infamously in Robert Putnam’s *Bowling Alone* (Putnam, 2000). Younger demographic groups are less likely to volunteer, join civic associations, and interact in face-to-face communities. Rather, these age groups prefer their identities to be multi-faceted and not reducible to a singular label. While “active

participation” in the environmental movement has declined over the last 40 years, engaging in individual pro-environmental behaviors has remained stable (Dunlap, 2010). This is echoed in this project’s findings, where participants had a wide range of perspectives as to the appropriate scale at which to engage in environmental problem solving. The older demographic groups tended to be more sympathetic towards the organizing tactics employed by the grassroots groups of the late 1960’s and early 1970’s. Putnam’s research would suggest that these groups will increasingly be replaced by groups placing their attention at very different scales- either the national and international scale, per the Ecomodernists, or at the very individual scale, per the Ecofatalists. That said, with the recent election of President Donald Trump, the scale and frequency of grassroots organizing has emerged within a markedly younger age demographic. It is too early to know whether or not this represents a rupture to Putnam’s study.

A second trend, associated with the growth of climate change as a central organizing issue, has made the environmental movement increasingly accepting of technological solutions to environmental problems. Many of these technologies simply did not exist during Dunlap’s era, or at least not at the same scale. The majority of the earliest solutions to environmental problems involved government regulations, which spurred a wave of technological problem solving (e.g., improved engine designs to lower vehicle emissions, scrubbers to reduce air pollutants). As shown in this research, even participants skeptical about technological solutions acknowledged their role in addressing global climate change. In many cases this acceptance was done somewhat begrudgingly, or otherwise couched in language that makes certain to disengage solutions with what, to some, are sinister associations. Klein, for example, evaluates emergent technology with respect to whether or not they are “corporatist”, “extractivist”, or reproduce colonial structures (Klein 2015). This leaves her vulnerable to critique given the need for large-scale renewable deployment to reduce carbon emissions at the level necessary to reduce climate change (Boisvert, 2014).

Finally, today’s attitudes towards the environment are increasingly inseparable from other social issues, with related attitudes serving as a proxy for political affiliation. Kahan has demonstrated the way in which the science of climate change is so strongly correlated with political party identification that they could

form a single construct (Kahan, et al., 2012). Many environmental problems have been addressed from within the existing capitalist economic structure, as seen in the rise of the corporate sustainability movement, “green” MBA’s, the “triple bottom line” accounting framework, and more. Thus the political polarization of environmentalism is problematic insofar as a mutually beneficial relationship between the economy and the environment is consistent with aspects of traditional conservatism. On the political right, environmental efforts may be rejected out of hand rather than evaluated for their specific merits.

Research Considerations

This research employed triangulation wherein multiple approaches to data collection were used to reinforce the findings. This study collected Likert-type scale survey data and conducted in-depth interviews using the Repertory Grid technique for evaluation. The resulting data was appraised through descriptive statistics, cluster analysis, differential analysis, and principal component analysis. Given the exploratory and experimental nature of this study, validity was reinforced through multiple research methodologies displaying consistent and complimentary results.

A particularly unique aspect of the methodology was having participants supply *both* the elements and constructs in the repertory grid interviews, and later employing content analysis to provide generalizations about the sample as a whole. Leaving elements and constructs open is not an unusual approach to repertory grid analysis, but is more typically applied when the respondent’s grid is being analyzed as a single unit. Content analysis is frequently employed to identify trends common to a set of grids, but in these circumstances elements are almost always supplied by the researcher. In this project, two competing objectives drove the decision to leave both elements and constructs open in addition to using content analysis. First was the desire to reveal the unique worldview of each participant through the repertory grid interview process. Second was the hope of identifying trends and making generalizations about the sample as a whole. Multiple approaches to element selection were considered and ultimately rejected. Pre-selecting elements simplifies analysis but risks introducing bias by making assumptions about which items the researcher believes are important and unimportant. Having participants volunteer both the elements and

constructs is more time consuming as it necessitated the use of content analysis to reveal trends across the sample as a whole. Despite involving additional time and effort, this approach minimized researcher bias and facilitated the identification of trends and differential analysis based on demographic variables. As with most decisions based on research design, there are benefits and drawbacks. In this case, the constructs had to be analyzed separately from elements. This meant that in the generalization process the rating of each element with respect to the construct poles could not be included. Leaving both elements and constructs open should be considered when concerns about the introduction of researcher bias is high, and there is a desire to both analyze grids individually and make generalizations about the overall sample. To avoid the loss of valuable information, this will ideally be complimented by analysis of individual grids that include the rating of elements according to the construct poles.

Another unique aspect of the methodology applied in this research was the pairing of a pre-screener questionnaire with the repertory grid interviews, and the subsequent use of multiple analytical approaches (e.g., descriptive statistics, cluster analysis, differential analysis, content analysis, principal component analysis) to understand the participants as individuals and as a group. Findings proved consistent across these multiple approaches, reinforcing and adding validity to the study as a whole. For example, the Ecofatalists had the highest mean score on the questionnaire item, “How important is...people making small changes in their daily lives?”. This finding was supported by the content analysis of the repertory grid interviews, wherein the respondent at the center of the Ecofatalist cluster *only* suggested actions that an individual could enact themselves. This validated the argument that this segment was highly focused on the importance of individual behavior while rejecting action at larger scales. A second example of mutually reinforcing multiple methodologies involved the Ecomodernists. The Ecomodernists had the highest mean score of all groups on the questionnaire item, “Environmental problems will eventually be solved through better technology”. This support for technological solutions by the Ecomodernists was confirmed by the content analysis of repertory grid interviews, which revealed Ecomodernists suggesting green technologies at a much higher rate than other groups. Analyzing participants using multiple approaches revealed that their core views remained relatively consistent across data collection and analysis techniques. Despite the contentious “quantitative-qualitative”

debate within the social sciences (Trochim, 2006), this research supports the assertion that multiple methodologies can strengthen findings. Employing triangulation reduced the risk that a single finding was due to poorly phrased question items or statistical noise. Researchers interested in combining repertory grid interviews with quantitative survey data should be reassured that this project found these approaches to be mutually reinforcing.

Applications

The longstanding use of the New Environmental Paradigm scale demonstrates that there remains prolific demand for a concise scale that measures environmental worldviews. The NEP is regularly used in studies of environmental attitudes (e.g., Schultz & Zelezny, 1999; de Groot & Steg, 2008) and behaviors (e.g., Casey & Scott, 2006; Olli, Grendstad, & Wollebaek, 2001). It has been incorporated into more comprehensive theories of beliefs and behaviors, such as Stern and Dietz's Value Belief Norm theory (Stern, Dietz, Abel, Guagnano, & Kalof, 1999), Schwartz's norm-activation model (Schwartz, 1977), and Ajzen's Theory of Planned Behavior (Ajzen, 2011). The NEP has also been used in conjunction with studies of risk perception (Slimak & Dietz, 2006), willingness to pay (Cooper, Poe, & Bateman, 2004), as well as cross-national studies (Pierce, Lovrich, Tsurutani, & Abe, 1989) and the environmental worldviews of children (Manoli, Johnson, & Dunlap, 2007). This high level of demand has two implications for this research. First, by providing researchers with a critique of the NEP, future studies of environmental worldviews may reconsider the use of specific items to improve the NEP's explanatory value, and recognize that the NEP measures only part of contemporary environmental thought. As researchers recognize that the NEP has both strengths and weaknesses, they may become more open to employing other measures of environmental attitudes, values, and beliefs. The Environmental Attitudes Inventory, for example, incorporates strong measures of environmental attitudes aggregated by subscale and is analytically robust. Second, the broad application of the NEP suggests that there will be a wide audience for a renewed scale (or scales) that succinctly measure contemporary environmental worldviews once the findings from this study are fully

operationalized. The use of well-vetted multi-item scales measuring psychological constructs remains a core methodological tool of social science research and will likely continue to be so in the future.

The development of the environmentalist typology suggested in Paper 3 is similar to the approach to psychographic segmentation employed by political and non-profit groups to motivate action on climate change and other environmental issues. Segmentation allows an institution to understand a group on the basis of their deeper worldviews, rather than their attitudes towards case-by-case topics and current issues. This enables institutions to develop targeted communication strategies through identifying the groups with which their goal (i.e. attitudinal or behavioral change) is most likely to be successful. By ascertaining these shared values, institutions are less likely to expend their limited resources engaging with a group who is unlikely to engage in targeted pro-environmental behaviors. Segmentation is typically conducted using a three-step process— the market is segmented and profiled; the segments are evaluated with respect to the degree they are worth engaging with; and finally the institution designs an outreach strategy for the groups that they have deemed worthwhile of further engagement (Moutinho, 2000). With respect to climate change, segmentation has been successfully employed to mobilize carefully selected sub-groups. For example, the environmental law firm Earthjustice used a segmentation-based typology of the general population to target three groups that they perceived as amenable to climate change issues but who harbored conceptual barriers towards supporting environmental groups like Earthjustice. After conducting a values-based segmentation, they reframed their communication strategies to connect with each group on the basis of their attitudes and values (American Environics, 2007). From there, they mapped these groups by census tract in the Pacific Northwest, enabling political strategy groups to campaign in those locations armed with a robust psychological profile of the environmental attitudes and values they were likely to encounter in each area. Far from a purely academic exercise, these typologies can have a tangible impact on attitudinal, behavioral, and political change. With further validation, this four-group segmentation could serve as an outreach template for institutions working to alter the attitudes, behaviors, and political engagement of the general population.

Opportunities for Further Research

Nature, technology, and scale of societal response were hypothesized to be the underlying dimensions differentiating contemporary environmentalism. More research is needed to clarify the role “nature” and “the natural” play within contemporary environmental attitudes and values. Namely, these include elucidating whether the minimal presence of pristine nature in participant responses was due to the methodology or whether participants saw non-human nature less relevant in the context of global climate change. Another item that deserves further examination given its prominence in this study is technology. Participants were mixed about its culpability in environmental degradation, it was repeatedly volunteered in open-ended interviews, and it strongly differentiated participant clusters. Further, “technology” may be representative of underlying dimensions such as time (forward thinking versus backwards thinking), trust in authority, and assessment of risk. Finally, the role of scale warrants further exploration, especially as related to theories of social change. Scale is rarely operationalized within the measurement of pro-environmental worldviews, but regularly influences mainstream debates (Robbins & Moore, 2015). In short, while this study illuminated aspects of the roles that nature, technology, and scale of societal response play within contemporary environmental thought, many questions remain.

This project was designed as the first step in developing a psychological construct measuring contemporary environmentalism, namely an updated version of the New Environmental Paradigm scale. This may consist of a single scale, but will more likely consist of a multidimensional measure containing unidimensional sub-scales that can be fielded individually or as a single unit. Standard construct development guidelines state that the first step in construct development is to clearly define the target construct (Clark & Watson, 1995). This was done in this project by contrasting the target construct that the NEP purports to measure (pro-environmental thought) with the actual target construct which is much broader and diverse. The next step in construct development is to create an item pool using the aspects of the NEP that need to be changed, added, or eliminated. This may include tangential or unrelated items that will eventually be dropped. Key areas such as technology should be addressed in more depth. Question items should be created using standard development practices, including avoiding technical and imprecise terms, not using complex

sentences, clearly defining what is being asked, employing ordinal rating scales, avoiding double-barreled questions, ensuring the answer choices anticipate all possible responses, and steering clear of leading or emotional language (Fowler, 1995; Dillman, 2000). Refining the question item set is an iterative process, so once an item pool is written or replicated from existing reputable scales they should be fielded using a large but affordable sample such as Amazon's Mechanical Turk (ideal $n = 100-200$, per Clark & Watson, 1995). Principal component analysis and Cronbach alpha reliability testing could be used to determine the most powerful question items in each of the emergent and hypothesized sub-constructs before the items are refined accordingly. Individual items should be revised and rewritten until the pool is reduced to measure the target construct. Once this reduced set of question items is finalized, one or more partners should be sought to field a national survey. These potential partners ought to have a common interest in improving a quantitative scale to measure pro-environmental attitudes, and may include academic social science research units, opinion research firms, and non-profits focused on climate change attitudes. Potential partners include the Yale Program on Climate Change Communication, Harvard Center for the Environment, Lewis and Clark College Department of Environmental Studies, EcoAmerica, Climate Access, and Environics Canada. A national survey (minimum $n = 2000$) should be representative per the census demographics (e.g., age, gender, race/ethnicity, party identification, education, geography) and fielded using a reputable online partner (i.e. Qualtrics Analytics). The scale or scales should then be evaluated psychometrically.

There is an important caveat that needs to be stated before engaging in further research on this topic. The hypothesis motivating this study was that the New Environmental Paradigm scale lacks construct validity, or put more simply, it does not measure what it purports to measure. But construct validity is only one aspect of what makes a scale robust. Scales measuring psychological constructs must have construct validity, "usability", meaning they are succinct and able to be easily integrated into larger studies, and statistically reliability. This latter issue was not addressed in this study, but understanding it is imperative as the NEP has been repeatedly challenged on the basis of its reliability. There remains no accepted "gold standard" for measuring environmental attitudes, though research suggests that it is both hierarchical (Pierce & Lovrich, 1980), meaning that a fundamental orientation towards the world explains environmental

worldviews, as well as multidimensional (Maloney, Ward, & Braucht, 1975; Schultz, 2001; Stern & Dietz, 1994). By not addressing these findings, Dunlap and Van Liere paved the way for more criticism of the NEP, including its tendency to break out into five sub-scales, the way in which multiple forms of the scale lead to divergent results, problems with fielding across cultures, and the way Dunlap and Van Liere conflated cognition, affect, and behavior (Hawcroft & Milfont, 2010; Milfont & Duckitt, 2010). Thus even a theoretically robust scale will have minimal use if it doesn't take heed of past research on the vertical and horizontal structure of environmental attitudes (Milfont & Duckitt, 2010). This research project identified ways in which an updated scale would have improved construct validity and be more likely to measure contemporary environmental worldviews. But an updated scale must be designed to explicitly avoid analytical issues as well as rectifying the theoretical issues that were the focus of this research.

Conclusion

Fundamentally, this research confirmed the need for an updated tool that is capable of measuring contemporary pro-environmental thought. Attempts to quantify environmentalism have consistently made unspoken assumptions about what it means to be pro-environmental, and in the name of analytical reliability, the NEP has simplified what has always been a complex and diffuse concept. The NEP is predicated on the idea that environmentalists will respond to a set of question items in similar ways, and this assumption was not validated by this study. Many participants in this study (who work for environmental organizations, volunteer for environmental causes, and vote on the basis of environmental issues) would be described as possessing weak pro-environmental worldviews if evaluated only using the NEP. The diversity of worldviews identified in this research presents the inescapable conclusion that the NEP captures only a small slice of contemporary environmentalism and therefore lacks construct validity.

The New Environmental Paradigm scale is by no means a failure; in fact, its robustness has given it a remarkably long life. Any updated version of the New Environmental Paradigm scale will also not be applicable universally, and ideally subject to continual reassessment as environmental worldviews transform in relation to their broader context. To determine the success of a psychological construct based on whether or

not it remains immutable over time is shortsighted. It is only through continual reassessment and modification will the New Environmental Paradigm scale maintain its academic and popular relevance. Riley Dunlap designed the survey that was to become the New Environmental Paradigm Scale in a markedly different political and social landscape. The development of a new scale is no abstract academic exercise, as the environmental worldviews of the general public inform what is considered socially, economically, and politically possible. A new scale that accommodates the emergent changes within pro-environmental thought has, therefore, the potential to help create and sustain a more livable planet.

APPENDIX A

Question Items- The New Environmental Paradigm Scale (15-item revised version)

The respondent's belief in an inherent balance of nature

- The balance of nature is very delicate and easily upset
- The balance of nature is strong enough to cope with the impacts of modern industrial nations
- When humans interfere with nature, it often produces disastrous consequences

The existence of fundamental limits to growth

- We are approaching the limit of the number of people the earth can support
- The earth is like a spaceship with very limited room and resources
- Despite our special abilities humans are still subject to the laws of nature

Anti-anthropocentrism

- Plants and animals have as much right as humans to exist
- Humans were meant to rule over the rest of nature
- The earth has plenty of natural resources if we just learn how to develop them

The rejection of human exceptionalism

- Human ingenuity will insure that we do NOT make the earth unlivable
- Humans have the right to modify the natural environment to suit their needs
- Humans will eventually learn enough about nature works to be able to control it

The possibility of an impending ecological crisis

- The so-called "ecological crisis" facing humankind has been greatly exaggerated
- Humans are severely abusing the environment
- If things continue on their present course, we will soon experience a major ecological catastrophe

APPENDIX B

Pre-Screener

Part I

How important is each of the following issues compared to other problems facing this country?

- 1- Not important at all
- 2- Not that important
- 3- Important
- 4- One of the most important

(Randomized)

The Economy in general
Unemployment
Government
Immigration
The Environment
Race relations
Healthcare
Terrorism

People often make trade-offs when deciding what is important to them. An example of a trade-off could be stimulating the economy versus protecting the environment. Using a 1-5 scale with the economy on one end at the environment on the other, indicate which is more important to you.

- 1- Stimulating the economy
- 2
- 3
- 4
- 5- Protecting the environment

Do you consider yourself an environmentalist?

- 1- Yes
- 2- No

Part II

How important are each of the following in solving environmental problems?

- 1- Not important at all
- 2- Not that important
- 3- Important
- 4- One of the most important

People making small changes in their daily lives
People working together in small groups ("grassroots" action)
National laws and policies (for example, the Clean Air Act)

International agreements (for example, the Copenhagen Climate Talks)

Please indicate your level of agreement with the following statements.

- 1- Strongly disagree
- 2- Somewhat disagree
- 3- Somewhat agree
- 4- Strongly agree

(Randomized)

Nature would be at harmony if human beings would leave it alone.

Almost everything we do in modern life is harmful to nature.

The balance of nature is fragile and easily upset.

Environmental problems will eventually be solved through better technology.

Technology causes more environmental problems than it solves.

We are approaching the maximum number of people the earth can support

We will experience a major ecological catastrophe if society continues on its present course

The earth has limited room and resources

Shopping decisions made by individuals can solve environmental problems

APPENDIX C

Repertory Grid Template

Topic

The diagram illustrates a Repertory Grid Template. It features a grid structure with a shaded top section and multiple rows of cells. The grid is composed of a series of horizontal lines that form a series of rectangular cells. The top section of the grid is shaded with diagonal lines. Below this, there are several rows of cells, each containing a series of smaller rectangular cells. The grid is designed to be used for organizing and analyzing data, with the shaded top section likely representing a specific category or topic. The label 'Topic' is positioned to the left of the grid, indicating where the user should enter the topic name.

APPENDIX D

Crosstabulations of Pre-Screener Items by Cluster

Table D.1
Demographics by Cluster

	Pragmatic Reformers (1)	Activist Greens (2)	Ecomode rnists (3)	Ecofatalists (4)	Total
n=	5	9	3	5	22
<i>Age</i>					
19-24	20%	0%	0%	20%	9%
25-34	40%	33%	100%	20%	41%
35-44	20%	33%	0%	60%	32%
45-54	0%	11%	0%	0%	5%
55-64	0%	11%	0%	0%	5%
65+	20%	11%	0%	0%	9%
<i>Gender</i>					
Male	60%	44%	67%	60%	55%
Female	40%	56%	33%	40%	46%
<i>Race/ethnicity</i>					
White	80%	67%	100%	40%	68%
Hispanic/Latino	0%	22%	0%	20%	14%
Black/African American	0%	11%	0%	20%	9%
Asian	20%	0%	0%	0%	5%
Biracial	0%	0%	0%	20%	5%
<i>Education</i>					
Completed High School	20%	0%	0%	0%	5%
Vocational School/Some university	0%	22%	0%	20%	14%
Completed University	40%	22%	33%	20%	27%
Postgraduate	40%	56%	67%	60%	55%
n=22					

Appendix D: Crosstabulations of Pre-Screener Items by Cluster (*continued*)

Table D.2

How important are each of the following in solving environmental problems?

	Pragmatic Reformers (1) n= 5	Activist Greens (2) 9	Ecomod ernists (3) 3	Disappointed Modernists (4) 5	Total 22
<i>Q1. People making small changes in their daily lives*</i>					
Not important at all (1)	0%	0%	67%	0%	9%
Not that important (2)	0%	22%	33%	0%	14%
Important (3)	100%	78%	0%	40%	64%
One of the most important (4)	0%	0%	0%	60%	14%
Mean	3.00	2.78	1.33	3.82	2.82
STDEV	0	.441	.577	.548	.795
<i>Q2. People working together in small groups</i>					
Not important at all (1)	0%	0%	0%	0%	0%
Not that important (2)	20%	78%	100%	0%	18%
Important (3)	80%	22%	0%	80%	68%
One of the most important (4)	0%	0%	0%	20%	14%
Mean	2.80	3.22	2.00	3.20	2.95
STDEV	.447	.441	0	.447	.575
<i>Q3. National laws and policies</i>					
Not important at all (1)	0%	0%	0%	0%	0%
Not that important (2)	0%	0%	0%	20%	5%
Important (3)	0%	22%	33%	60%	27%
One of the most important (4)	100%	78%	67%	20%	68%
Mean	4.00	3.78	3.67	3.00	3.64
STDEV	0	.441	.577	.707	.581
<i>Q4. International agreements</i>					
Not important at all (1)	0%	0%	0%	0%	0%
Not that important (2)	0%	11%	33%	40%	18%
Important (3)	40%	44%	33%	60%	46%
One of the most important (4)	60%	44%	33%	0%	36%
Mean	3.60	3.33	3.00	2.60	3.18
STDEV	.548	.707	1.00	.548	.733

Appendix D: Crosstabulations of Pre-Screener Items by Cluster (*continued*)

Table D.3 (1/2)

Please indicate your level of agreement with the following statements

	Pragmatic Reformers (1) n= 5	Activist Greens (2) 9	Ecomod ernists (3) 3	Disappointed Modernists (4) 5	Total 22
<i>Q5. Nature would be at harmony if human beings would leave it alone</i>					
Strongly disagree	20%	0%	67%	0%	14%
Somewhat disagree	20%	22%	33%	40%	27%
Somewhat agree	40%	22%	0%	60%	32%
Strongly agree	20%	56%	0%	0%	27%
Mean	2.60	3.33	1.33	2.60	2.73
STDEV	1.14	.866	.577	.548	1.032
<i>Q6. Almost everything we do in modern life is harmful to nature*</i>					
Strongly disagree	20%	0%	67%	0%	14%
Somewhat disagree	20%	0%	33%	40%	18%
Somewhat agree	60%	56%	0%	60%	50%
Strongly agree	0%	44%	0%	0%	18%
Mean	2.40	3.44	1.33	2.60	2.73
STDEV	.894	.527	.577	.548	.935
<i>Q7. The earth has limited room and resources</i>					
Strongly disagree	0%	0%	0%	0%	0%
Somewhat disagree	0%	0%	67%	20%	14%
Somewhat agree	20%	11%	33%	40%	23%
Strongly agree	80%	89%	0%	40%	64%
Mean	3.80	3.89	2.33	3.20	3.50
STDEV	.447	.333	.577	.837	.740
<i>Q8. We are approaching the maximum number of people the earth can support</i>					
Strongly disagree	0%	11%	67%	0%	14%
Somewhat disagree	0%	22%	0%	20%	14%
Somewhat agree	20%	33%	33%	80%	41%
Strongly agree	80%	33%	0%	0%	32%
Mean	3.80	2.89	1.67	2.80	2.91
STDEV	.447	1.05	1.15	.447	1.019
<i>Q9. We will experience a major ecological catastrophe if society continues on its present course*</i>					
Strongly disagree	0%	0%	0%	0%	0%
Somewhat disagree	0%	0%	100%	0%	14%
Somewhat agree	0%	11%	0%	60%	18%
Strongly agree	100%	89%	0%	40%	68%
Mean	4.00	3.89	2.00	3.40	3.55
STDEV	.447	0.333	1.15	.447	1.02
<i>Q10. Technology causes more environmental problems than it solves*</i>					
Strongly disagree	40%	0%	67%	0%	18%
Somewhat disagree	60%	0%	33%	0%	18%
Somewhat agree	0%	67%	0%	100%	50%
Strongly agree	0%	33%	0%	0%	14%
Mean	1.60	3.33	1.33	3.00	2.59
STDEV	.548	.500	.577	0	.959

n=22

*question item used in segmentation

Appendix D: Crosstabulations of Pre-Screener Items by Cluster (*continued*)

Table D.3 (2/2)

Please indicate your level of agreement with the following statements

	Pragmatic Reformers (1) n= 5	Activist Greens (2) 9	Ecomod ernists (3) 3	Disappointed Modernists (4) 5	Total 22
<i>Q11. Environmental problems will eventually be solved through better technology</i>					
Strongly disagree	0%	22%	33%	0%	14%
Somewhat disagree	20%	44%	0%	80%	41%
Somewhat agree	80%	22%	0%	20%	32%
Strongly agree	0%	11%	67%	0%	14%
Mean	2.80	2.22	3.00	2.20	2.45
STDEV	.447	.972	1.732	.447	.912
<i>Q12. Shopping decisions made by individuals can solve environmental problems</i>					
Strongly disagree	20%	22%	33%	0%	18%
Somewhat disagree	0%	33%	33%	60%	32%
Somewhat agree	80%	22%	33%	20%	36%
Strongly agree	0%	22%	0%	20%	14%
Mean	2.60	2.44	2.00	2.60	2.45
STDEV	.894	1.130	1.00	.894	.963

n=22

*question item used in segmentation

APPENDIX E

Crosstabulations of Content Analysis by Cluster

Table E.1

Element Content Analysis: Differential Analysis by Cluster (*M* per person)

		Pragmatic Reformers <i>n</i> =	Activist Greens 9	Eco- modernists 3	Eco- fatalists 5
Category	Definition				
Adaptation/Planning Ahead	Implementing plans to avoid impacts of climate change; Adapting to impacts of changed climate	0	0.11	0.67	0.20
Community-based action/Shared services	Implementing solutions at the local level; Localization of production; Sharing services and resources	0.20	0.56	0.33	0.20
Preservation	Returning ecosystems to their “natural” state; Preserving functional ecosystems; Removing barriers to ecosystem functioning	0.60	0	0.33	0.80
Education/Awareness	Educating individuals; Motivating behavioral and attitudinal changes	1.20	1.11	0	0.20
Green Technology	Technological developments that enable lower emissions	1.80	1	3.67	1.80
Individual lifestyle behavior (apolitical)	Behaviors taken by the individual not directly related to politics	0.80	0.44	1	0.40
Individual lifestyle behavior (political)	Explicitly political behaviors engaged in by the individual	0.4	1	0	0
Policies/Regulation	Policies enacted by government to lower carbon emissions; Improved functioning of government; Regulation of business	1.40	1.78	0.33	0.60
Recycling	Reuse and recycling of materials already in commodity chain	0	0.56	0.33	0.60
Reduce resource consumption	Reducing carbon emissions through behaviors and practices	1.20	1.22	0.33	2.00
Reduce traditional car dependence	Reduce fossil fuel-based transportation and move to alternative forms of transportation	0.60	0.78	0.67	1.20

n=22

Appendix E: Crosstabulations of Content Analysis by Cluster (*continued*)

Table E.2

Construct Content Analysis: Differential Analysis by Cluster (*M* per person)

		Pragmatic Reformers <i>n</i> = 5	Activist Greens 9	Eco- modernists 3	Eco- fatalists 5
Category	Definition				
Economics	Economic issues, effect on GDP, role of the consumer, commodity chains	1.20	1.44	0.33	3.20
Social Change	How people exert their agency and engage with groups to enact change	1.6	1.55	1.33	1.60
Degree of difficulty	How difficult the solution would be to actually make happen, including whether the general public would be willing and engaged	0.80	1.00	2.00	1.20
Time	When change happens, temporal nature of solutions	1.40	1.66	0.33	0.40
Technology	Technological intensiveness of solutions (high vs. low)	1.60	0.55	1.67	1.00
Degree of upheaval	Degree to which solution is consistent with the status quo versus disruptive, how accepting public will be of solution	0.20	1.33	2.00	0.20
Broadness of impact	Whether the solution is single issue specific or general and multi-issue. Also includes the scope of the solution's impact.	0.80	0.89	1.00	0.80
Individual attitudes, values, behaviors	The role of individual decisions, worldviews, and interpersonal behaviors	0.20	0.88	0.67	0.80
Scale and place	Scale of change- local, global, micro, macro, etc.	0.60	1.00	0.67	0
Structural change	Over-arching structures that enable certain types of change over others	0.40	0.67	1.33	0.20
Land use issues	Land-use decisions and their impacts	0.80	0	0	1.60
Politics and public sector	Associated with government and the public sector	0.40	0.44	0.33	0.60
Misc.	Anything that doesn't fit into other categories	0	0.11	0.33	1.20
Ecocentrism and anthropocentrism	Focus of solutions, whether they benefit people or other species	1.00	0.11	0	0
Degree of effectiveness	Degree to which solution would be effective	0.20	0.22	0.67	0
Importance	Level of urgency and overall importance when compared with other solutions	0	0.55	0	0

n=22

APPENDIX F

Participant Distance from Cluster Centers

Table F.1

Distance from Cluster Centers

Cluster	RESPID	Distance
1	3	0.566
1	5	0.721
1	16	0.721
1	12	0.849
1	21	1.523
2	6	0.609
2	19	0.609
2	11	0.694
2	22	0.694
2	4	0.839
2	10	0.903
2	2	0.962
2	7	1.122
2	8	1.122
3	9	0.577
3	13	0.577
3	18	1.155
4	1	0.825
4	14	0.825
4	17	0.825
4	20	0.825
4	15	0.938

n=22

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